MARINE REVIEW.

VOL. XV. CLEVELAND, O., JANUARY 7, 1897. No. 2.

President of the Lake Carriers' Association.

Although that which is least expected very often occurs in big gatherings like the annual meeting of the Lake Carriers' Association, which takes place in Detroit next week, it is now more than probable that the association will select Capt. James Millen for the presidency. Capt. Millen has said several times that he was not seeking the office, and would have nothing to do with a contest for it. He is still of the same opinion, but he will find the Cleveland delegation ready to present his name and support him for the office, and this influence, which is the largest in the association, will bring about his election by a unanimous vote, which is the custom of the organization.

Capt. James Millen is distinctively a vessel owner. He has been in the business all his life, and his interests in vessels rank among the largest in Detroit. He is a member of the firm of Parker & Millen and is known everywhere on the lakes. A good likeness of him appears as a supplement to this issue.

The New Insurance Register.

A note in last week's Review regarding the work of Capt. J. V. Tuttle of Milwaukee, who is engaged in surveying lake vessels for a new insurance register, contained only a meager account of the scope of the new book. The register is, in fact, being prepared by Capt. F. D. Herriman of Chicago, who has represented the Bureau Veritas (French classification society) on the lakes for two or three years past, and who is employed for this work by a syndicate of insurance companies, including the British & Foreign, Insurance Company of North America, Sea and one or two others. These are the companies that last year made contracts at low rates for probably 85 to 90 per cent. of cargo insurance on flour, copper and other commodities. Alike to other underwriters, they have been very much dissatisfied with the Inland Lloyds Register, especially as regards steel vessels, and they are expecting from the work of Capt. Herriman and his assistants a complete and reliable classification of every vessel on the lakes. Capt. J. V. Tuttle and Capt. Angus McDougall have been at work for some time past going over vessels at the different ports, and sending their reports to Chicago, where the register is being made up. There will be no secret about ratings in this register. Instead of using the terms A1, B1, etc., the new register will designate the very best class of ships by the figure 100, and the ratings will be graded down from that figure. The information that is being collected by the surveyors will include all details as to sizes of scantlings, etc., and it is more than probable that the classification will be entirely on merit, with reductions even in some of the steel vessels to the 85 and 80 class. No valuations will be included in the register, as in all of the leading classification societies of the world the question of value is a matter foreign to the work of the surveyor. The publication of this register and the activity of the representatives of foreign underwriters indicate still lower insurance for the best class of lake vessels in future. The combination of companies publishing the new register would not undertake the expense of it if they did not intend to make a strong effort to increase their business on the lakes. It is understood also that Johnson & Higgins, the insurance brokers who have been placing big lines with foreign companies, have satisfied the underwriters with whom they have been dealing by a big profit on last year's business and that they will be enabled to offer still further inducements to lake vessel owners next season.

It was thought that the wooden steamer Aurora, which was kept in commission in the grain trade until Jan. 4, made her several late trips after other boats had gone out of commission, without insurance of any kind, but such was not the case. The Aurora, on account of extraordinary weight of timber in construction, found all of the underwriters ready to insure her for the short trip on Lake Erie between Toledo and Buffalo, and on her last trip from Chicago to Buffalo the insurance for both hull and cargo was placed through one general agency, that of C. A. McDonald & Co., Chicago.

Light-House Tenders and Light-Ships.

Lake ship builders do not seem to have made an effort to secure any part of the contract for three composite light-ships and two steel light-house tenders, for which bids were opened by the light-house board in Washington on Dec. 30. These vessels were illustrated and described in the Review of Dec. 17. Two of the light-ships and one tender will be built by the Bath Iron Works, Bath, Me., at $74,500 for each light vessel, to be completed in nine months, and $72,000 for the tender, to be completed in eight months. Lewis Nixon of Elizabeth, N. J., will build one tender at $72,000, in eight months, and Wolf & Zwicker of Portland, Ore., the other light vessel at $73,000, to be finished in ten months. One of the tenders, to be named Mayflower, will be stationed at Boston, and the other, to be named the Mangrove, will have headquarters at Key West, Fla. One of the light-vesselswill be stationed on Diamond shoal, Cape Hatteras, another off Fire island, and the third on San Francisco bar.

Lake Ship Yards Again Lead the Country.

Another report from the United States commissioner of navigation shows that the output of merchant steel vessels from lake ship yards is greater than the combined output of yards in all other parts of the country. During three months ending Dec. 31, 1896, three new steel steamers were registered on the lakes, and their aggregate gross tonnage was 13,890.30. The tonnage of four new steel steamers registered on the Atlantic coast was only 9,442.76, while on the western rivers there was only one new steel steamer of 390.51 tons. No steel vessels of any kind for the merchant service were built on the Pacific coast. No new steel sailing vessels were registered during the quarter. The complete report on both steel and wooden vessels is as follows.

SHIP BUILDING IN THE UNITED STATES DURING QUARTER ENDING DEC, 31, 1896.

DISTRICTS.	WOODEN-SAIL.		WOODEN-STEAM.		STEEL-STEAM.	
	No.	Gross Tons.	No.	Gross Tons.	No.	Gross Tons.
Atlantic and gulf coasts	94	2,366.34	23	3,319.51	4	9,442.76
Pacific coast	10	1,965.17	5	1,282.45	...	.....
Great lakes	3	43.00	1	10.40	3	13,890.30
Western rivers	...	.....	24	3,784.80	1	390.51
Total	107	4,374.51	53	8,397.16	8	23,723.57

SUMMARY OF SHIP BUILDING IN THE UNITED STATES DURING SIX MONTHS ENDING DEC. 31, 1896.

CLASS.	Quarter ending Dec. 31, 1896.		Quarter ending Sept. 30, 1896.		Total.	
	No.	Gross Tons.	No.	Gross Tons.	No.	Gross Tons.
Sail vessels	107	4,374.51	115	30,209.30	222	34,583.81
Steam vessels	61	32,120.73	101	46,867.87	162	78,988.60
Grand total	168	36,495.24	216	77,077.17	384	113,572.41

There seems to be a considerable diversity of opinion as to the best way of securing and maintaining deeper water, whether it wili be done by deepening the present channels or by providing a system of dams. I think a memorial should be addressed to congress or to the secretary of war, by the Lake Carriers' Association, urging the government to make a sufficient appropriation to enable this matter to be thoroughly investigated and if possible determine whether either or both methods is the best to employ, and then work to have follow sufficient appropriation to enable us to enjoy a 20-foot channel. If thought necessary a committee from the association might be sent to Washington to look after the matter.—H. G. Dalton of Cleveland.

James Dunn of Muskegon, Mich., a veteran lake captain, died suddenly at Michigan City Saturday. He was sixty-three years of age.

CAPT. JAMES MILLEN OF DETROIT.

Supplement to the Marine Review, Cleveland, O., Jan. 7, 1897, Volume XV., No. 2.

Experiments with Models of Ships.

Editor Marine Review:—I notice in your columns that the navy department has secured a partial appropriation and has begun at Washington the construction of a tank in which to make experiments with models of ships. This is a most sensible idea and one that was

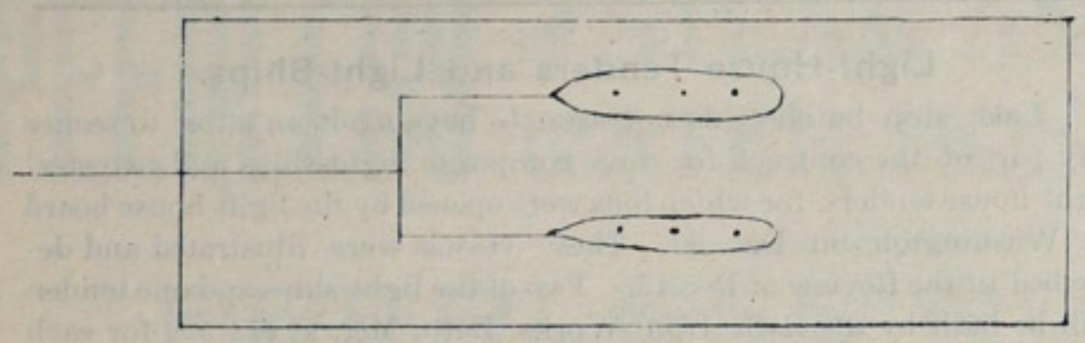


FIG. 1

offered to the secretary of the navy about 1882, long before the white squadron was thought of. A word or two with reference to tank experiments on a small scale may be of interest at this time, and I send you herewith a rough sketch involving the working value of tests of different lines (wetted surface). First, the models are made full, that is a complete model so far as the body of the ship is concerned. Two methods are used, one the whiffle-tree, and the other the weight per

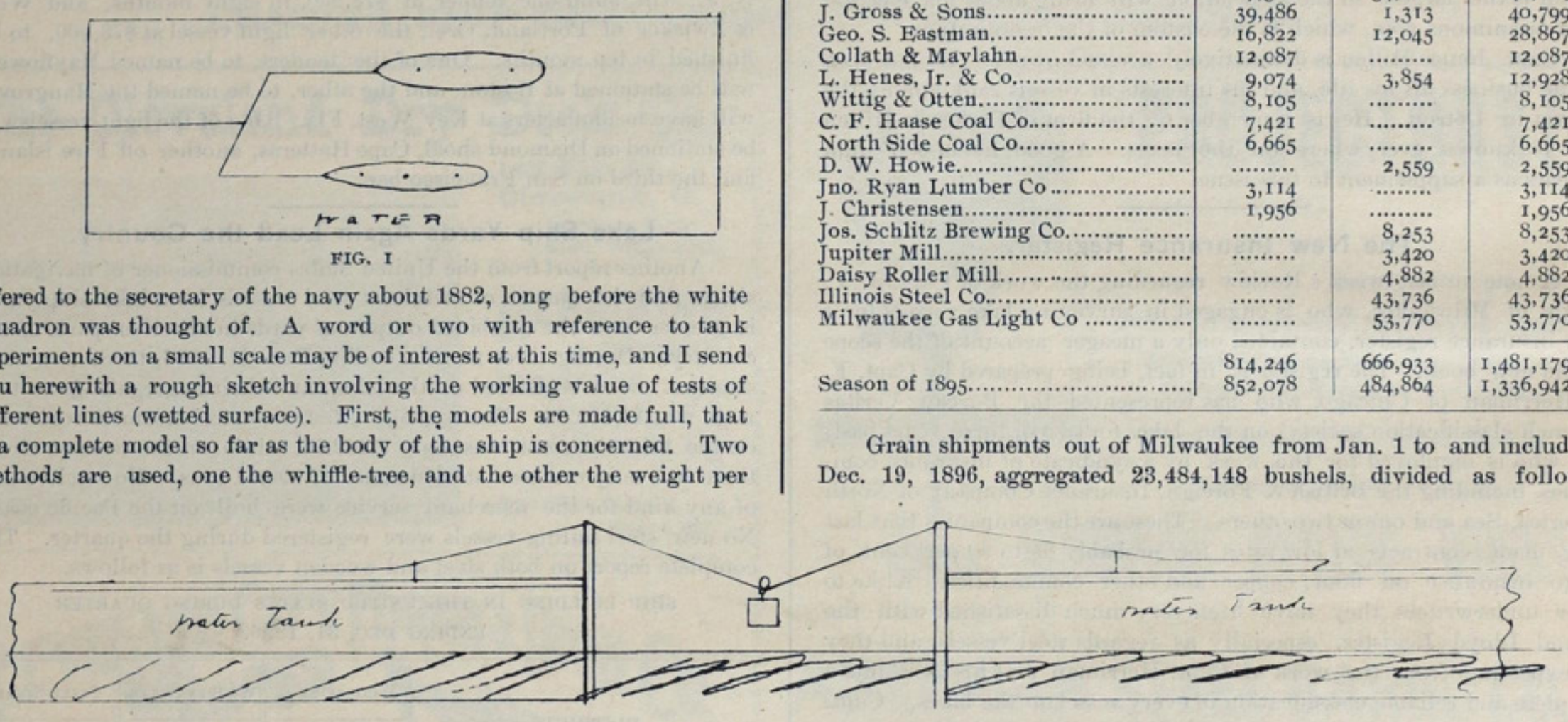


FIG. 2

pound per foot or inch wetted surface. It will be seen at a glance that, with every thing equal in dimensions, the ship with the most skin friction will pull the hardest. Thus it will be noted in Fig. 1, that this form of vessel pulls hardest on the whiffle-tree, and the model of less friction goes ahead. In Fig. 2 the workings are the same, excepting that the weight is used. When the weight is used, the model that comes to it with the smaller degree of friction will give the weight slack line quicker and easier than its rival, and must necessarily reach the objective point ahead of its rival. I made tests of this kind years ago in experimenting with racing shells.

Port Huron, Mich., Jan. 4, 1897. J. J. Lynn.

"How many war vessels and merchant vessels have you built in your ship yards?" was asked by one of a party of friends of Charles Cramp, at whose great ship yard the new United States warship Alabama is being built. "The Alabama will be our 290th ship," was Mr. Cramp's reply. "And," he continued, "that figure '290' is especially noteworthy in this instance, because of an interesting fact and historical coincidence. The rebel cruiser Alabama was for a long while a "nameless ship," and her only designation was by number. The coincidence which strikes me as interesting is that the piratical cruiser Alabama was No. 290, and the United States war ship is No. 290. The rebel ship was the 290th ship built by the Lairds, in England; Uncle Sam's new ship is the 290th new vessel built in our yard at Philadelphia."

Cylinders of the quadruple expansion engines that are being built by the Chicago Ship BuildingCo. for the new Wolvin steamer Crescent City, and which are to be supplied with steam at 250 pounds pressure by Babcock & Wilcox water tube boilers, will be 19, 28, 41 and 60 inches diameter with 42 inches common stroke of piston.

Receipts of Coal by Lake at Milwaukee.

A statement prepared by Capt. J. F. Trowell of Milwaukee gives a full account of coal received by the different companies at that point during the past season. The receipts aggregated 1,481,179 net tons, of which 814,246 tons was anthracite and 666,933 tons bituminous. Following is the statement:

RECEIPTS OF COAL AT MILWAUKEE BY LAKE, SEASON OF 1896.

COAL COMPANIES.	Anthracite, net tons.	Bituminous, net tons.	Total.
B. Uhrig & Co.	115,886	208,161	324,047
Northwestern Fuel Co.	172,085	121,636	293,721
H. M. Benjamin Coal Co.	107,376	74,397	181,773
Phila. & Reading Coal and Iron Co.	84,676	37,232	121,908
Coxe Bros. & Co.	79,166	30,458	109,624
Whitnall & Rademaker	89,008	11,209	100,217
R. P. Elmore Co.	53,931	15,392	69,323
F. R. Buell	7,388	34,616	42,004
J. Gross & Sons	39,486	1,313	40,799
Geo. S. Eastman	16,822	12,045	28,867
Collath & Maylahn	12,087	.....	12,087
L. Henes, Jr. & Co.	9,074	3,854	12,928
Wittig & Otten	8,105	.....	8,105
C. F. Haase Coal Co.	7,421	.....	7,421
North Side Coal Co.	6,665	.....	6,665
D. W. Howie	.....	2,559	2,559
Jno. Ryan Lumber Co	3,114	.....	3,114
J. Christensen	1,956	.....	1,956
Jos. Schlitz Brewing Co.	.....	8,253	8,253
Jupiter Mill	.....	3,420	3,420
Daisy Roller Mill	.....	4,882	4,882
Illinois Steel Co.	.....	43,736	43,736
Milwaukee Gas Light Co	.....	53,770	53,770
	814,246	666,933	1,481,179
Season of 1895	852,078	484,864	1,336,942

Grain shipments out of Milwaukee from Jan. 1 to and including Dec. 19, 1896, aggregated 23,484,148 bushels, divided as follows: Wheat 2,494,703 bushels, corn 422,378, oats 12,978,028, barley 6,324,342, rye 1,264,697.

There are now twenty-one torpedo boats built and building for the United States navy. But this is only a drop in the bucket compared with England's undertakings in this line. The British admiralty is about ready to place more orders for torpedo boat destroyers and this time the number will be twenty, all of which are to be of 33 knots speed. The highest speed expected from any of the torpedo boats building in the United States is 30½ knots, from No. 9 and No. 10, building at Bath, which on only 146.4 tons displacement, have 4,200 horse power. No. 11, building at San Francisco, is to develop 5,600 horse power, and is by far the largest vessel, displacing 273 tons, while she is expected to make 30 knots. From the boats advancing toward completion at Bristol, R. I., 27½ knots is expected, and from the Seattle boat 26 knots. The three newly finished at Baltimore are to make 24½ knots, and there are also three 22½-knot and four 20-knot boats under construction.

Among important business changes in Cleveland is the announcement that, owing to the death of Mr. H. J. Webb, which occurred some time ago, the affairs of the firm of H. J. Webb & Co. have been entirely closed up, and the business of the firm is now in the hands of W. C. Richardson, the junior partner, who is well known to vessel men in all parts of the lakes, and who has really been the active manager of the concern for more than a year past, owing to the long illness of Mr. Webb. Mr. Richardson not only retains the management of the fleet of vessels that were controlled in the office of H. J. Webb & Co., but will also continue a large vessel brokerage and insurance business that was built up by the old firm.

The Review has excellent photographs of lake ships.

Lower Level of Prices in Iron.

In reviewing the recent Rockefeller-Carnegie ore and transportation deal on the lakes, and in directing attention also to the cheaply mined ores of the Mesabi range, as well as the pronounced drift amor g consumers in favor of Basic open-hearth steel, which can be made largely from non-Bessemer ores, the Iron Age of New York says:

"The one absorbing question before every manufacturer of iron and steel in the United States must be that of cutting down costs of production. We are steadily forced to a lower level of prices. For a time associations or pools may hold up values, but the irresistible tendency is downward. The iron trade has been drifting into a condition which is critical for many engaged in it. Two very important changes—cheap Mesabi ores and the drift to open-hearth steel are the main factors. While it will not do to base figures on the extremely low costs of a few isolated Mesabi mines, the fact remains that the supply from that district is bound to crowd down values in spite of any temporary success which may attend on pools or combinations. It must not be forgotten, too, that a number of mines in competing districts can come pretty close to Mesabi figures in laying down ore in the markets. The effect upon them is to force them to surrender a part of their profit. It must be considered that there are very powerful interests in the Lake Superior ore trade outside of the Rockefeller mines, railroad and vessels. Conspicuous among these, although not the only one, is the Minnesota Iron Co. They may be led into alliances which give large producers excellent opportunities. Then there are the interests in the east, who enjoy an exceptional position through control of the very cheap Cornwall ores. What changed conditions mean will be promptly understood in the trade when we state that Bessemer pig can be produced at $7.50, and that steel billets can be made at a satisfactory profit by some producers in the middle west, with an open market on ore, at close to $13 per ton. The cost price of some individual concerns is considerably below the latter figures. In the west and in the east correspondingly low figures may be reached. It does not, of course, follow that any such prices will prevail in the markets. But they mark the present boundary line which producers must seek to cross in order to be safe against successful assault. Those at a distance can readily figure at what prices the central west can invade their territory.

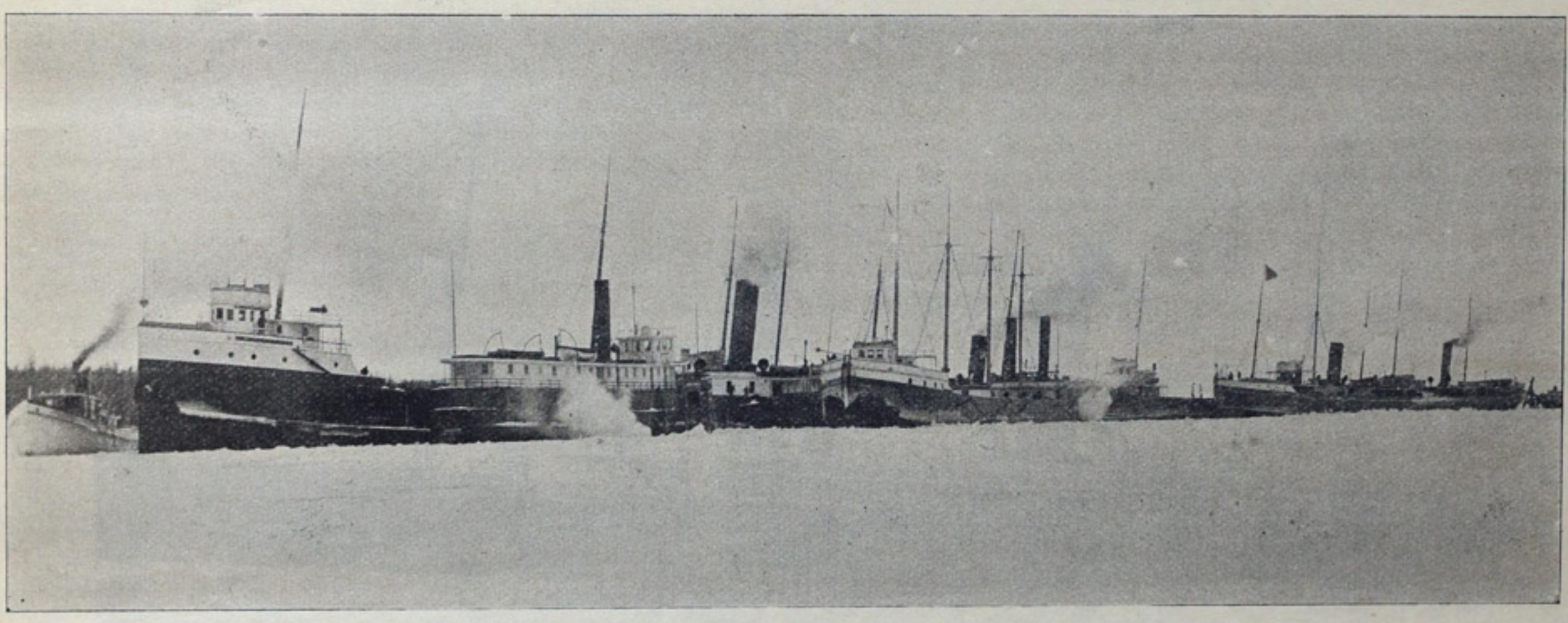
It may be claimed from a technical standpoint that high requirements can not be met by Basic open-hearth steel, but it is certain that the open hearth furnace has been gaining on the Bessemer converter. The difference in cost between the two has been shrinking steadily, largely because managers have been giving the same close attention to the design and operation of open hearth plants which was once bestowed exclusively on Bessemer works. Crude methods of handling materials have disappeared, and a large tonnage is now secured. The off-Bessemer ores of the lakes, being cheap, have made it possible to produce a Basic steel in the reverberatory which could compete in cost with the product of the low phosphorus ores. But granting all this, it does not follow that the Bessemer converter is going to die out as the purveyor of soft steel for miscellaneous finished material, nor does it follow that the acid open hearth will shrink into insignificance before its newer rival. It will take a good deal of evidence before equality of quality is conceded to the basic open hearth steel as compared with acid open hearth metal."

Chicago Grain Fleet.

Although the capacity of the Chicago grain fleet is much lighter than it was a year ago, it is quite probable that figures given out at the close of navigation did not include all the vessels that may be regarded as grain carriers. Some of the vessels may require repairs, mainly caulking, but they are nevertheless available for grain, and if these are included, as well as all of the steel vessels, the total capacity in sixty-five steamers and twenty-four schooners is about 7,500,000 bushels of wheat. About twenty vessels have been chartered thus far. Rates now quoted for storage and delivery at Buffalo in the spring are 2¾ cents on wheat, 2¼ on barley and 2 cents on oats. Following is the list of vessels:

Steamers—Uganda, J. J. McWilliams, Ketcham, Nicaragua, New Orleans, Germanic, Niko, P. Minch, Cadilac, City of Berlin, Cranage, Plankinton, E. M. Peck, Elphicke, Kirby, R. R. Rhodes, R. Mills, Samoa, H. H. Brown, City of Venice, J. W. Moore, R. P. Flower, Lewiston, City of Rome, Thos. Adams, Geo. Stone, Caledonia, Raleigh, Madagascar' I. W. Stephenson, Egyptian, Armour, City of Cleveland, Prentice, Mecosta, Ranney, City of London, Yuma, Forbes, Bielman, Doty, Parnell, G. W. Morley, City of Paris, E. C. Pope, Viking, L. C. Waldo, Iron King, Curry, Colgate, J. J. Hill, S. Mitchell, Iroquois, Geo. N. Orr, Thos. Palmer, Tampa, M. M. Drake, A. D. Thompson, Merida, Gratwick (steel), Lagonda, Geo. T. Hope, Whitney and John Mitchell.

Schooners—Scotia, Plymouth, Ashland, Moravia, Celtic, McLachlan, Iron Queen, Jeannette, barge 134, Wayne, barge 130, G. B. Owen, Halsted, Middlesex, Grampian, Paisley, Churchill, Tokio, Hartnell, Aurania, Nirvana, Michigan, Fannie Neil and E. C. Hutchinson.



Tug Boynton. City of Bangor. Algomah. Northern Line Steamer. Yakima. Griffin.
(Photo by Bell, Sault Ste. Marie, Mich.)

ICE JAM IN LITTLE MUD LAKE, JUST OUTSIDE OF DIKE.—DECEMBER 7, 1896.

A chart of the whole of Georgian bay, the best thing of its kind as yet published, has recently been issued by the British admiralty, and may be had from the Marine Review, No. 409 Perry-Payne building. Another chart, of a very clear and interesting kind, taking in Lake Huron, Georgian bay, Lake Erie and connecting channels, has also been issued recently by the same authority.

Rear Admiral Joseph S. Skerrett, whose death was announced a few days ago, had the reputation of being the best navigator in the navy. He was born at Chillicothe, O., and was sixty-four years of age.

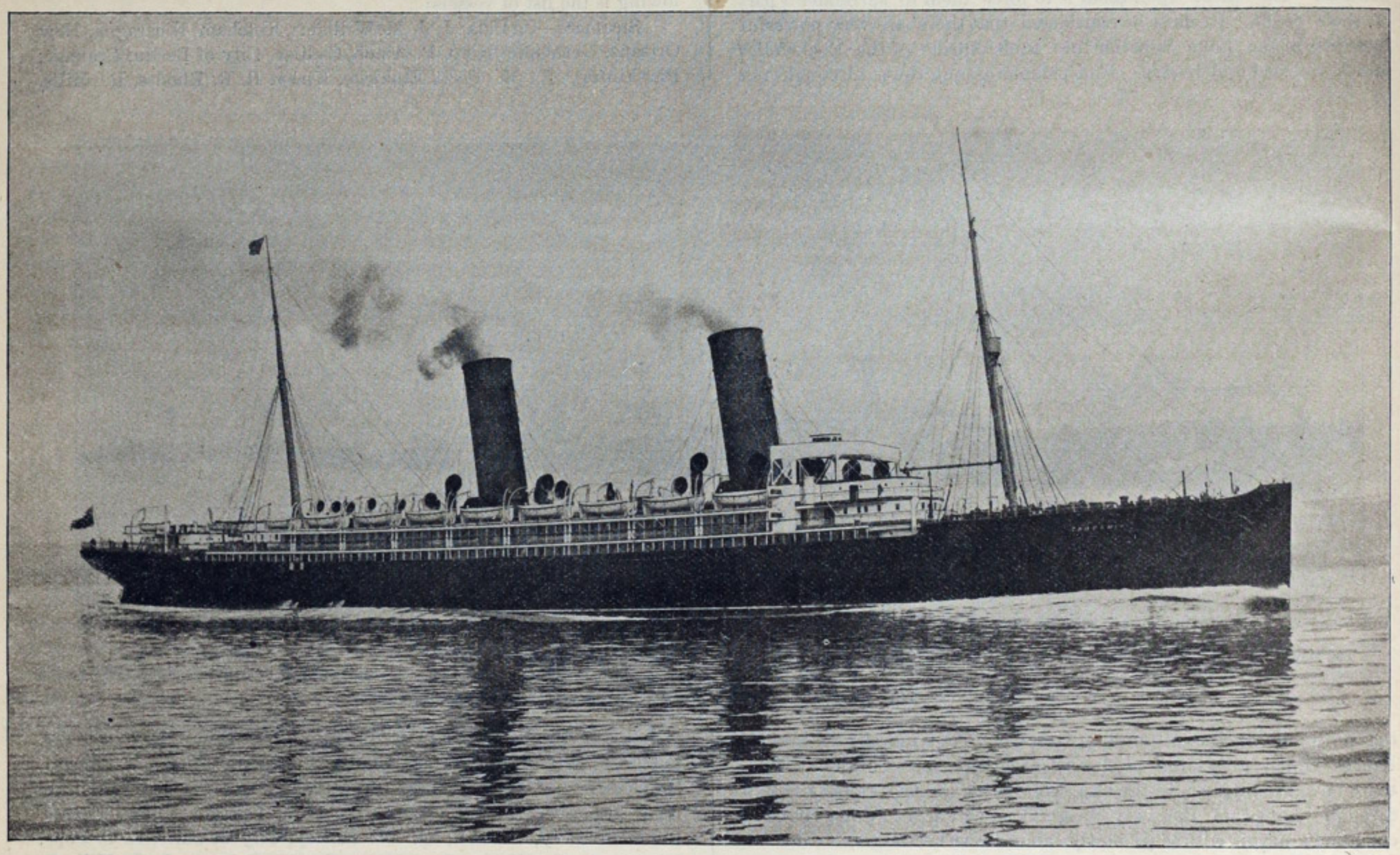
Grain Shortages.

Mr. Harvey D. Goulder, counsel for the Lake Carriers' Association, says he has little hope of favorable results from any effort that may be made at the coming meeting of the Lake Carriers' Association to substitute for the present "cut-throat" bill of lading in the grain trade any new bill of lading that might be intended to overcome the trouble with grain shortages. He is confident, of course, of the ability of vessel owners to make a good case in court when the amount of the shortage is thought sufficient to go into court with it. But the vessel owners who regard the present custom as very unjust, and who would like to find some means of avoiding a law suit every time they have a shortage, are certain to bring the question up at the meeting. This is proven by the interest that has been shown in the subject since it was taken up by the Review two or three weeks ago:

Mr. H. G. Dalton of Pickands, Mather & Co., Cleveland, says: "The association should devise some means whereby the delays and shortages incidental to the transportation of grain might be corrected. There are many ways of doing this, but probably an agreed bill of lading, conceding to the shipper what is fair, yet insisting for the carrier what also is fair and equtiable, would be the best and quickest way of accomplishing it."

Mr. James Corrigan, ex-president of the association, is also of the opinion that a new bill of lading should be adopted for grain, but he would go further and endeavor to agree upon another bill of lading that would overcome delays in the coal trade. A most pronounced opinion on the grain question comes from Mr. A. B. Wolvin of Duluth. He says:

"Some limit of liability as to shortage of grain cargoes carried by the vessels should most certainly be fixed by the vessels. Every owner will agree with me that the item of grain shortages is becoming enormous, and they must also by this time realize that no one else is going to do anything for them in the way of relieving them of this burden. I know it is claimed by a great many that for the vessels to insert a shortage liability clause in their bills of lading, would to a greater or less extent render these ladings objectionable to the shippers for their use in hypothecation, on the grounds that they would not be satisfactory as to quantity, In rebuttal of this I would simply call the attention of the association to the fact that in flax cargoes carried, a shortage liability clause is inserted in the bills of lading, as follows: 'It is understood and agreed that the vessel shall not be responsible for shortage exceeding one-half bushel per 1,000 bushels carried. The vessel to deliver all flax seed on board and collect freight upon actual out-turn.' This clause is inserted and is always taken by the shippers without question. Why not, then, let this same shortage liability clause be extended to cover all varieties of grain that may be carried by the vessels? I feel this would be easy of acomplishment if the Lake Carriers' Association were to adopt this measure and the vessel owners instruct their various representatives at the different grain-shipping ports that this clause must be inserted in the ladings for the protection of the vessel. It is also high time that some attention on the part of vessel owners was given to the matter of securing better dispatch in the handling of grain cargoes. In evidence of the hardship vessels are compelled to undergo it is only necessary to recall the grain blockades that seem regularly to occur at Buffalo during the latter part of the season. The railroad companies surround themselves with demurrage clauses, which seem to inure to their benefit. Why not have the vessel owners of the great lakes through their Lake Carriers' Association unite in the adoption of a similar lading, to be issued by their own representatives, the same as is the case with all the other carriers, and which ladings shall contain stipulations that will relieve the vessels of the burden of unfair shortages, and will also secure for the vessels prompt handling of their cargoes or a resaonable compensation for demurrage beyond a reasonable time allowance for their loading and discharging?"



CUNARD COMPANY'S ATLANTIC LINER CAMPANIA.

Mr. Byron Whitaker of Detroit has retired from the firm of B. Whitaker & Sons, leaving the business to his sons, Charles and W. H. Whitaker, who will be partners in a new firm, to be known as Whitaker Bros. Mr. Byron Whitaker will devote his attention to the management of his vessels.

If we did not get your boat in the list of sixty which we had photographed in the Detroit river, we can get a picture of her if she passes the Sault in daylight.

Unfavorable Outlook for 1897.

In former years there was always considerable talk in January about contract rates on iron ore, but this year there is nothing on which to base any estimates regarding next season's business. It must be admitted that the conditions of the iron market, and especially the tendency toward a very low range of values, is not encouraging to the vessel interests. Heavy stocks of Bessemer ore on Lake Erie docks will cause the ore dealers, even if they succeed in maintaining their organization, to hold off for some time in the matter of making prices for next year, and it is quite certain that the prices will be very much lower than they were a year ago. It may be that the policy of the incoming administration when fully announced, and when action is taken towards carrying it into effect, will have a marked improvement on business conditions, but there will be nothing definite in this regard for a couple of months. It is the general opinion, therefore, that there will be nothing done in ore for next year until well onto the opening of navigation.

Association of Masters and Pilots.

As a result of the efforts of Grand Captain's Clerk B. F. Perkins of Camden, N. J., who has been on the lakes during the past six weeks organizing new harbors of the American Association of Masters and Pilots, that organization now has a membership of about 600 in lake cities, and the interests of deck officers in this part of the country will be well represented at the annual meeting of the national organization, which will open in Washington Jan. 26. At the annual meeting of Cleveland harbor, No. 42, held Tuesday evening, the following officers were elected: Captain, Charles E. Benham; first pilot, Frank Place; second pilot, Samuel Allen; purser, C. E. Benham; captain's clerk, Lee Brogan. C. E. Benham was chosen national representative and Lee Brogan alternate.

Huron harbor, No. 46, elected J. E. Reynolds captain and national representative and J. W. Montgomery captain's clerk, purser and alternate. J. H. Norton, Duluth, will represent harbor No. 44 at Washington.

Valley harbor, No. 45, was formed at Bay City last week. This harbor has eighteen charter members and new names are being added to the list. The insurance and other privileges gained by membership in this national organization will undoubtedly make it very popular with captains and pilots in the Saginaw valley. Following is a list of officers elected for the ensuing year: Captain, Joseph Sauers; first pilot, Alfred Forrest; second pilot, Henry Bennett; captain's clerk, Wm. Thorp; starboard quartermaster, Jas. Owen; port quartermaster, Walter Hazen; saloon deck watchman, Fremont Schutte; chaplain, Charles Brown.

The story of Henry W. Oliver of Pittsburg being paid a commission of $2,000,000 for effecting the recent Carnegie-Rockefeller ore deal was probably given out as a joke. Such commissions are sometimes heard of in connection with government bond transactions, but not in anything like the Mesabi mine deal, although this latter transaction was a very big affair. It is reasonable to expect, however, that Mr. Oliver has profited by his connection with Messrs. Carnegie and Rockefeller in this matter. He owned a half interest in the Oliver mine, and it is understood that part of this was sold, so as to give the Carnegie company control of the property, but the sale was probably on terms quite advantageous to Mr. Oliver.

Hughes Bros. & Bangs of Syracuse, N. Y., who were the principal contractors at the 800-foot lock at the Sault, and who recently secured the big breakwater job at Buffalo, have just undertaken another government job of immense proportion. They are the lowest bidders on the Delaware bay harbor of refuge work, which involves an expenditure of about $4,600,000.

If the post office department secures an appropriation for a new boat for Detroit river marine service, the craft to be built will be small but fast, and will be fitted with the conveniences and appliances of a post office, so that the mail may be handled entirely on the river, thus avoiding the disadvantage of delay in delivery through an occasional boat being missed.

A supplement in this issue is the list of vessels laid up at different points around the lakes. No harbor tugs or small trading vessels are included in the list.

A Young Apprentice in the Navy.

Editor Marine Review:—Some of your readers may be interested in the inducements offered to apprentices in the United States navy. They are far superior to those offered by any other navy in the world. The applicant who enters the navy with an ambition to learn the work that is put before him during the time of his apprenticeship is given every opportunity possible to prepare himself for advancement from one position to another. Boys of good character, who have no physical defect, and who can read and write fairly well, are admitted into the navy when when only fourteen to fifteen years of age. The applicant at this age must measure 4 feet 9 inches in height, and weigh not less than seventy pounds; between fifteen and sixteen, 4 feet 11 inches in height and eighty pounds; between sixteen and seventeen, 5 feet 1 inch and ninety pounds, and between seventeen and eighteen, 5 feet 2 inches and 100 pounds. They must serve to the age of twenty-one as boys and junior seamen, and after they have reached that age they rank as seamen or petty officers. They are now allowed $45 for outfit, a fact which considerably enhances the value of the service. To discover the exact number of petty officers on board a fully equipped ship is by no means an easy task, but the number of these minor prizes is certainly encouraging, while still higher up, as the final goal of the common sailor's aspirations, are the subtsantial berths of the four warrant officers—held by the boatswain, the carpenter, the gunner and the sailmaker—whose pay and privileges are the same as those of the junior officers. And now as to the rate of pay: The pay of boys enlisted as third-class apprentices is $9 a month. The next promotion to second-class apprentice, brings $10, and the next, to third-class apprentices, brings $11 a month, followed by first-class seamen apprentices with $24 a month, these two grades corresponding respectively to ordinary seamen and able seamen, or simply seamen, whose pay is $19 and $24 a month. It will thus be seen that a first-class seaman apprentice and an able seaman get each the respectable sum of $288 a year, which is $128 in excess to the highest sum paid to a first-class seaman in the British service, the only other navy in the world worth considering on the score of pay and promotion. There is, besides, the daily ration of 30 cents, which runs through the ship from apprentice to commander, for, strange as it may appear to some people, Uncle Sam distributes the same fare to the officers that he gives to the apprentice, and that, too, only when on sea duty. There are no other allowances whatsoever made to the officers. They have to furnish their own mess equipment and everything else.

Box 106, Newport News, Va. Walter F. Lakin.

New Officers Among Marine Engineers.

M. E. B. A. No. 86, Menominee: Past president, N. A. Scofield; president, Alfred Larson; vice-president, Chas. Hanson; treasurer, A. Bruce; secretary, N. A. Scofield; financial secretary, W. N. Casson; recording secretary, Alfred Larson; chaplain, W. H. Farr; conductor, J. Leaf; door-keeper, F. Bordwell.

M. E. B. A. No. 2, Cleveland: President, Henry F. MacAuley; vice-president, William H. Kennedy; chaplain, George Masters; corresponding secretary, H. H. Farr; recording secretary, William Most; financial secretary, James Sanderson; treasurer, M. B. Sturtevant; inside guard, George Allen; outside guard, J. G. Donahue; trustees, William Kennedy, George Masters, M. B. Sturtevant; delegates to national convention, M. B. Sturtevant and H. F. MacAuley.

Huronia M. E. B. A., No. 43, Port Huron:—President, George H. Bowen; first vice-president, Walter Thorn; second vice-president, Anthony Rein; treasurer, Arthur Armson; financial secretary, Irving Buzzerd; corresponding secretary, Geo. Miller; recording secretary, James Southgate; chaplain, Peter Finney; conductor, Harvey Dupuy; door-keeper, Henry Rondeau; trustees, A. Armson, W. P. Boynton, E. M. Murdock; representative to national convention, Arthur Armson; alternate, Geo. Miller.

M. E. B. A. No. 9, Milwaukee: President, J. C. Collins; vice-president, W. G. Fell; second vice-president, G. C. Olesen; treasurer, J. Havlick; financial secretary, John J. Conway; corresponding secretary, Charles G. Forsyth; recording secretary, J. D. Desmond; chaplain, J. J. Staley; conductor, James Daley; outer door-keeper, Charles McCarthy; inner door-keeper, Edgar Doucett; trustees, Webb Chipman, Jr., G. C. Olesen and J. E. Packard; delegate to national convention J. C. Collins.

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

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Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats	416	45,109.47
Total	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30.	1891	204	111,856 45
" " "	1892	169	45,968.98
" " "	1893	175	99,271.24
" " "	1894	106	41,984.61
" " "	1895	93	36,352.70
" " "	1896	117	108,782.38
Total		864	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ¼ per cent. of the whole, but largely in American vessels.

If the question of grain handling charges at Buffalo comes up in open session at the Lake Carriers' meeting in Detroit next week, a very lively discussion may be expected. The matter may be fixed up by executive officers of the association in advance of the general meeting, but this is hardly probable, as there is a feeling of discontent among a large number of members that is liable to show itself anyhow. Rumors of big profits made from the vessel interests through the sale and handlng of damaged grain, and through commissions of various kinds, have caused a great deal of talk, but it is all of a suspicious kind that is not based on facts. The big revenue derived by the elevators from steam shovels and James Kennedy's large profits in the business of handling grain are, however, different matters that will admit of an effort to reduce expenses. The charge of $1.50 per 1,000 bushels for the use of steam shovels is declared highly exorbitant and is looked upon as one of the abuses of power in the elevator business. On receipts of 200,000,000 bushels of grain at Buffalo, which is not beyond the capacity of the elevators, this charge for steam shovels would foot up $300,000, which is equal to 6 per cent. on an investment of $5,000,000. The vessel owners who are opposing this expense claim rightfully that the value of the steam shovels is a mere trifle as compared with the profits that are derived from the use of them. As regards the profits derived by Mr. Kennedy on his grain contract, which probably exceeded $20,000 during the past season, it can be said positively that the association will not deal with any union of shovelers, or with anybody who can not give a reasonable guarantee against danger of labor difficulties, but there is a general dipoition to cut down tne handling charges as a whole, and an effort will probably be made to have the contract which Mr. Kennedy now holds bear its share of the reduction.

It is probable that the coming meeting of the Lake Carrier's Association will take some action recommending and encouraging improvements in various harbors around the lakes, so that the advantages of deeper channels that are expected in the connecting rivers may be extended to the harbors. This will have reference, of course, to expenditures by municipalities that will be supplemental to the government work. Within the past week the city officials of Cleveland, who have been working along this line, have been accorded great credit for having closed up contracts with railway companies that will result in a material increase in the width of the river from its mouth to a point some distance above the Central viaduct. This is the main portion of the harbor, and the improvement as a whole will be the most important work of its kind as yet undertaken by any of the lake cities. It will involve an expenditure of $500,000, including the amounts paid to owners of river front property. The old river bed channel is to be opened into the lake, but not as a navigable channel, as a stationary railway bridge is to span the new cut. A winding place for vessels will, however, be provided at the head of the old river bed.

We have made a great deal of fuss over the contracts just closed by the Cramps and the Union Iron Works for two cruisers to be furnished to the Japanese government, and it is to be hoped that more foreign orders will follow these two. But after all we have little to crow about in this small job. Sir Wm. Armstrong & Co. of England built, during 1896, nineteen steel vessels of 54,157 tons, and with one exception this entire product was for foreign owners. Several of the vessels were big cruisers built for Japan and for the Spanish-American republics. The vessels to be built in Philadeplhia and San Francisco for the Japanese government will be unarmored cruisers, sistership, of about 4,800 tons displacement. They will cost $1,000,000 each, and will resemble the U. S. S. Olympia and the Japanese cruiser Yoslino, built by Yarrow & Co. of England.

Now that practically all of the maritime nations of the world have adopted the rules of the road prepared by the International Marine Conference, it is announced that an effort will be made to bring about another extension in the direction of uniformity by the American delegates, who will meet soon to consider the advisability of making the American rules regulating the navigation of inland waters conform to the international rules. It may as well be understood at the outset that the vessel interests of the lakes will oppose any change in the present regulations governing navigation on the lakes. The present intention of the American delegates to the conference is probably to change the rules applying to bays, sounds and rivers bordering on the sea-coast, but it might be well to have them understand that the White law, which was recently adopted, and which applies especially to the lakes, is satisfactory to all lake interests.

For about thirty years, intermittently, the steel-clad monitor Puritan, which was put in commission at New York a few days ago, has been under construction. This is certainly not a ship building record for our navy to be proud of. This vessel is a monitor of the same type as the Terror, Amphitrite, and Monterey, though larger than either, as she is 298 feet on the water line, and is of 6,600 tons displacement, with twin-screw triple expansion engines capable of developing 3,700 horse power. The original hull of the Puritan was built under the direction of John Ericsson, and was turned over to the government in 1864.

The present talk of the Wheeler ship yard at West Bay City being sold has no foundaton, and is simply a rumor of the kind that is always circulated about concerns that undertake big improvements and must, of necessity, carry a heavy indebtedness. It has been well kown for a long time past that improvements of the Wheeler plant have involved a big expenditure of money, and that a full return on such investments is slow in materializing, but there is no more cause for the present rumors than there was for all that has been said for a year or more past.

American merchant vessels have not as yet been heard of in Germany's new canal, although our war vessels cut quite an important figure in the dedication ceremony. During the year ending June 30, 1896, there passed through the Kiel canal 16,834 ships that had to pay toll. Their tonnage was 1,505,983. Of these 7,531 were steamships, aggregating 1,140,578 tons. Their flags were as follows: German 14,957, Belgian 3, British 184, Danish 812, French 81, Dutch 381, Norwegian 60, Russian 84, Swedish 336, all other countries 9, and if any carried the stars and stripes it was not deemed worthy of mention.

It would seem that the engineer force of the British navy realize the necessity of preparing for a certain amount of experience among firemen who are to be employed on water tube boilers. The admiralty some time ago detailed a number of torpedo boats for the instruction of firemen in handling the water tube generators.

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building.

Around the Lakes.

The wooden tug building at Benton Harbor, Mich., is for Lydon & Drews of Chicago and not for the O. B. Green Dredging & Dock Co.

A statement from the collector of customs at Erie reports shipments during 1896 of 492,563 net tons of anthracite and 179,640 tons of bituminous coal.

It is expected that President Uhler of the Marine Engineers Beneficial Association will visit all branches of the organization on the lakes within the next two weeks. He was in Cleveland Tuesday.

Thompson Bros. of Port Huron have purchased the hull of the old fire boat Weatherly, recently dismantled in Cleveland and it is said they will put into her the engines of the old lake tug Crusader.

Carrington is the name selected for the new steel barge building at South Chicago for C. W. Elphicke & Co. The steel barge building at the same yard for James Corrigan of Cleveland will be named Amazon.

A force of about thirty men employed largely by Gilchrist & Fletcher, are engaged in repairing wooden vessels at Alpena. The schooners Nellie Mason and Kitchen and a couple of harbor tugs are now undergoing repairs.

Some vessel masters trading to Milwaukee claim to have difficulty in distinguishing the white flash light on the north point of Milwaukee bay, on account of powerful electric street lights recently established in the vicinity of the harbor light. They will petition the United States light-house board to substitute a bright red light with a white flash.

Mr. E. C. Pope of Cleveland, who represented the Norrie ore mine, and who is now with Pickands, Mather & Co., also conducted quite a large business in copper, tin, lead, spelter, etc. He announces the sale of this business to the Gibson & Price Co. of Cleveland. Mr. C. B. Smith who has been associated with Mr. Pope for the past sixteen years, having especial charge of this department of the metal business, will hereafter be with the Gibson & Price Co.

The business of towing logs from Canadian lake ports to points in Michigan, where they are put into saw mills, has certainly developed into a big industry during the past few years. It is estimated that this traffic in 1896 included 263,759,847 feet, of which there was towed to the Saginaw river 146,338,400 feet, to Detroit 20,269,000 feet, to East Tawas 19,680,000 feet, to Alpena 27,472,446 feet, to Cheboygan 40,000,000 feet.

The Holland & Emery Lumber Co., which has its nominal headquarters at East Tawas, Mich., but which is controlled by Nelson Holland of Buffalo, is preparing to move its saw mills from East Tawas to Byng inlet on Georgian bay, just as soon as the ice goes out in the spring. This company has been handling about 45,000,000 feet of logs annually, towing them to Tawas from their Canadian lands in rafts. They have now concluded to do all their sawing in Canada. The East Tawas mills are already partly dismantled, but it is not probable that the plant at Byng inlet will be in readiness to do any sawing until August.

Grand Secretary B. F. Perkins of the American Association of Masters' and Pilots, has finished for the present his work of organizing new harbors on the lakes. The Detroit harbor which is now fully organized will be known as No. 47, and is officered as follows: Captain, A. C. MacCallum; captain's clerk and purser, Walter A. Ashley; first pilot, Thomas J. Brody; second pilot, Lewis Elliott; chaplain, Shepherd W. Currie; starboard quartermaster, Phillip H. Trezise; port quartermaster, Alfred L. Currie; saloon watchman, Thomas J. Carney. Capt. Perkins is now engaged in visiting the harbors in Toledo, Cleveland and Buffalo, while on his way to his home in Camden, N. J. The Cleveland harbor will hold its first annual ball at Army and Navy hall, Jan. 19.

A British turreted whaleback steamer, the Oak Branch, had a remarkable experience recently on a voyage from Shanghai to Sydney, N. S. W., in water ballast. She lost her propeller and shaft in mid ocean and lay helpless in not the best of weather. There was an additional propeller and shaft aboard and her engineer set about to make repairs. The ballast aft was pumped out and the forward tanks filled. Then the extra shaft and propeller were swung over and fitted into place. The job required eight days, during which the weather was not favorable for the work.

Winter Traffic on Lake Michigan.

The volume of winter business in grain, flour and general merchandise that is being built up on Lake Michigan is certainly surprising. The Milwaukee Evening Wisconsin presents a list of eighteen freight steamers and car ferries that will be engaged in this traffic during the winter on different routes between the east and west shores of Lake Michigan. In 1896 there were only ten steamers in this service and a few years ago it was limited to two or three routes. The various routes for the present winter and the steamers either already covering or to cover them are as follows:

Flint & Pere Marquette company's Milwaukee, Manitowoc and Ludington line—car ferry Pere Marquette, steamers F. & P. M. Nos. 2, 3, 4 and 5, and Mary H. Boyce.

Milwaukee, Muskegon and Grand Rapids line—Steamers Lawrence and Petoskey.

Crosby, Milwaukee and Muskegon line—Steamers Osceola and City of Grand Traverse.

Grand Trunk company's Milwaukee and Grand Haven line—Steamers Nyack and Wisconsin.

Graham & Morton company's Milwaukee, St. Joseph and Benton Harbor line—Steamers Jay Gould and City of Duluth.

Ann Arbor company's line between Kewaunee, Manitowoc and Frankfort— Car ferries Ann Arbor No. 1 and Ann Arbor No. 2, and steamers George Farwell and J. C. Ford.

For handling grain there is the Flint & Pere Marquette company elevator at Ludington, while the Paine Bros. Co. has leased the Big Four elevators at Benton Harbor, and F. Kraus & Co. are erecting one at Grand Haven whch will be in running order by Feb. 15. The combined handling capacity of these three elevators is placed at nearly 150,000 bushels per day, an amount consderably in excess of possible shipments from Milwaukee, and sales can therefore be made without the slightest fear of delay in delivery unless through snow blockades or otherwise the east shore lines should be deprived of cars for transhipment.

Ship Masters' Association—New Officers.

Toledo lodge, No. 9:—President, Martin Christie; first vice-president, George Sage; second vice-president, Homer Durand; secretary, E. G. Ashley; treasurer, Isaac Gelispie.

Milwaukee lodge No. 6: President, Henry Leisk; first vice-president, John McCoy; second vice-president, Peter Anderson; secretary, John McSweeney; treasurer, Fred Starke; delegates to grand lodge, Henry Leisk and Edward Saveland.

In the Cleveland lodge, No. 4:—Capt. John Ward has been elected recording secretary to succeed Capt. Robert Pringle, who resigned. Appointive officers named by President Bernard Nelson are: Chaplain, Carlton Graves; marshal, Frank Stenton; warden, E. Reimeirs; sentinel, B. Grey.

Buffalo lodge, No. 1:—President, A Clark; first vice-president, L. P. Goodale; second vice president, Frank Welcome; treasurer, Lyman Hunt; secretary, John Perew. Messrs. Clark and McNabe, incoming and outgoing presidents, will attend the meeting of the national lodge in Washington in January.

Chicago lodge, No 3: President, H. F. Loftus; first vice-president, C. H. Hubbard; second vice-president, L. B. Coates; marshal, Fred Weimar; chaplain, Wm. Shaw; warden, J. O. Wood; sentinel, Geo. Cotterell; treasurer, George Turner; secretary, F. B. Higgie; delegates to grand lodge, H. F. Loftus and J. H. Gallagher.

A reduction is noted each year in the output of the Saginaw Valley lumber district of Michigan. The time is not far off when shipments of lumber on the lakes will be confined entirely to Lake Superior. The output of the Saginaw river mills in 1896 was 316,797,879 feet, the smallest since 1865, and one hundred million feet less than in 1895, when the output aggregated 433,688,083 feet. In 1894 the output was 481,000,000, It is well known, of course, that only a small part of the output is now moved by water.

It is announced that all departments of the big works of the Bethlehem Iron Co. at South Bethlehem, Pa., are now in operation. The company's ordnance works will continue running day and night

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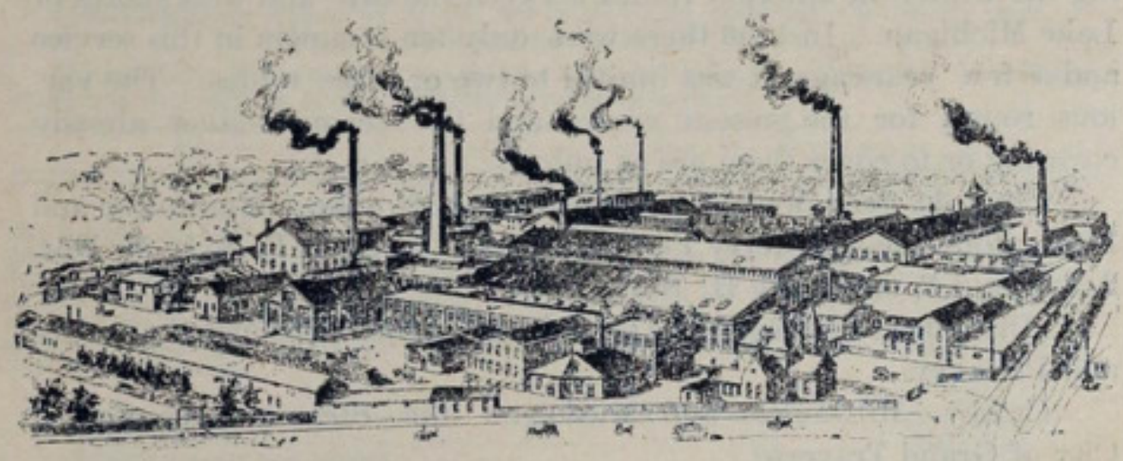
A photograph of the largest boat on the lakes, the Sir Henry Bessemer, will cost you only $1.50. Write the Marine Review.

A Large Copper Rolling Mill.

The accompanying illustration shows the extent of the manufacturing plant of Randolph & Clowes, Waterbury, Conn. This concern furnishes lake engine builders with seamless copper tubes, brass goods and other specialties. When engines of the North West and



North Land were building it was thought necessary to braize the feed and waste pipes but Randolph & Clowes had just completed special machinery that enabled them to furnish the more reliable seamless copper tubes. This firm now turns out 38-inch seamless copper tubes 6 feet long; 24-inch, 12 feet long, and 12-inch 20 feet long. Mr. George H. Clowes is the managing partner and the company has stores in Chicago, New York and other cities.

Cargo and Speed Records—Lake Freight Steamers.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches. From Lake Superior—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,637 gross or 5,194 net tons, Ashland to Conneaut, draft of 15 feet 9 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 207,000, bushels of corn, equal to 6,210 net tons, Chicago to Buffalo, 16 feet 8 inches draft; steamer Maricopa, Minnesota Steamship Co., Cleveland, 191,700 bushels of corn, Chicago to Buffalo; steamer Zenith City, A. B. Wolvin of Duluth, 289,000 bushels of oats, Chicago to Buffalo. From Lake Superior—Steamer Queen City, A. B. Wolvin of Duluth, 156,256 bushels of barley and 58,000 bushels of wheat, equal to 5,490 net tons, Duluth to Buffalo.

Coal—Schooner Geo. N. Hartnell, 4,777 net tons of anthracite, Buffalo to Milwaukee, draft 15 feet 5 inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Jan. 2, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	13,466,000	6,010,000
Duluth	2,919,000	8,000
Milwaukee	351,000	4,000
Detroit	384,000	61,000
Toledo	1,169,000	188,000
Buffalo	2,135,000	149,000
	20,424,000	6,420,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 21,000 bushels of wheat and an increase of 288,000 bushels of corn.

At the annual meeting of the several transportation companies controlling the fleet of vessels of which the late W. S. Mack was managing owner, the following board of directors was elected to serve for the ensuing year. Mrs. Margaret A. Mack, Wm. H. Becker, Frederick R. Seager, E. U. Pratt and William H. Mack. The directors elected the following officers: William H. Becker, president; Frederick R. Seager, vice-president; William H. Mack, secretary and treasurer. The meeting was held at Mentor, O., on the 6th inst.

In General.

A cruising steam yacht to be built by Howard Gould will be of steel, 260 feet over all, 34 feet beam and 20 feet depth. She will have two decks below the spar deck.

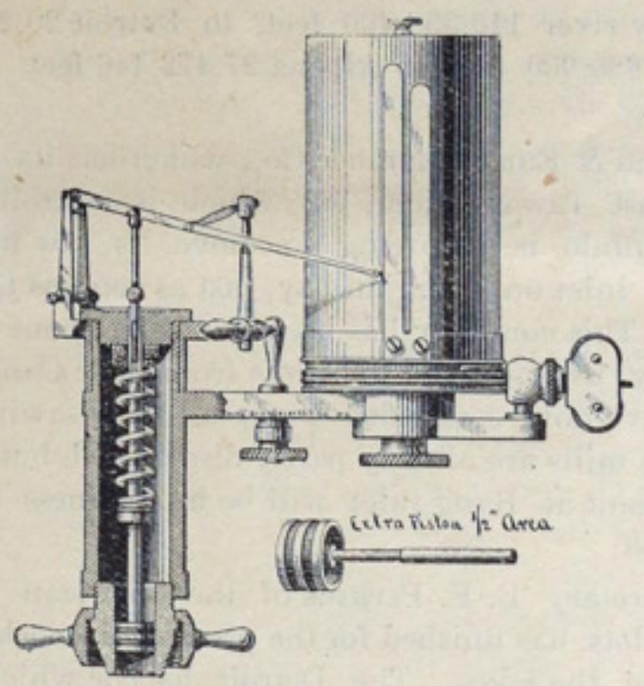
The death of F. A. Hine in 1893 and the entrance of Mr. Robertson's sons into the firm has led to changing the name of the Hine & Robertson Co. to Jas. L. Robertson & Sons. The same steam specialties will be carried, and the business will be pushed with new vigor. The address is 40 Cortlandt street, New York.

The American Blower Co., Detroit, Mich., has published a very artistic catalogue. The cover, fronitspiece and introduction are unusually handsome. It tells of blowers from a to izzard, especially the a b c of them, for that is what the book is about—The American Blower Co.'s blowers. There are a number of these blowers in use on lake steamers in connection with the Howden system of hot draft.

According to the Railway Age of Chicago, only 1,802 miles of new line was constructed in the United States in 1896, this being the smallest mileage in any year since 1875. The number of lines on which new tracks were laid is 163. These roads operate in thirty-eight of the forty-nine states and territories. A number of railroad enterprises which were begun in the early part of the year, were temporarily abandoned, owing to the financial agitation preceding the election.

High Pressure Robertson-Thompson Indicator.

This instrument is designed with a spcial view to the indication of extremely high pressures without in any way interfering with its use as an ordinary low pressure indicator. This improvement consists in the substitution of a piston of ¼-inch area instead of the usual piston of ½-inch area. In order to permit of the use of this smaller piston, the coupling is bored out to a smaller area, as is clearly shown in the cut. By this means every spring may be used for pressure equal to four times the number stamped thereon, instead of two, as is the case with the ordinary indicator; that is, a sixty pound spring may be used to pressures of 240 pounds, and a 100-pound spring to 400 pounds. Where an ordinary pressure is to be indicated, the extra piston which is furnished with it may be used. The parallel movement is similar to the ordinary Robertson-Thompson indicator, being



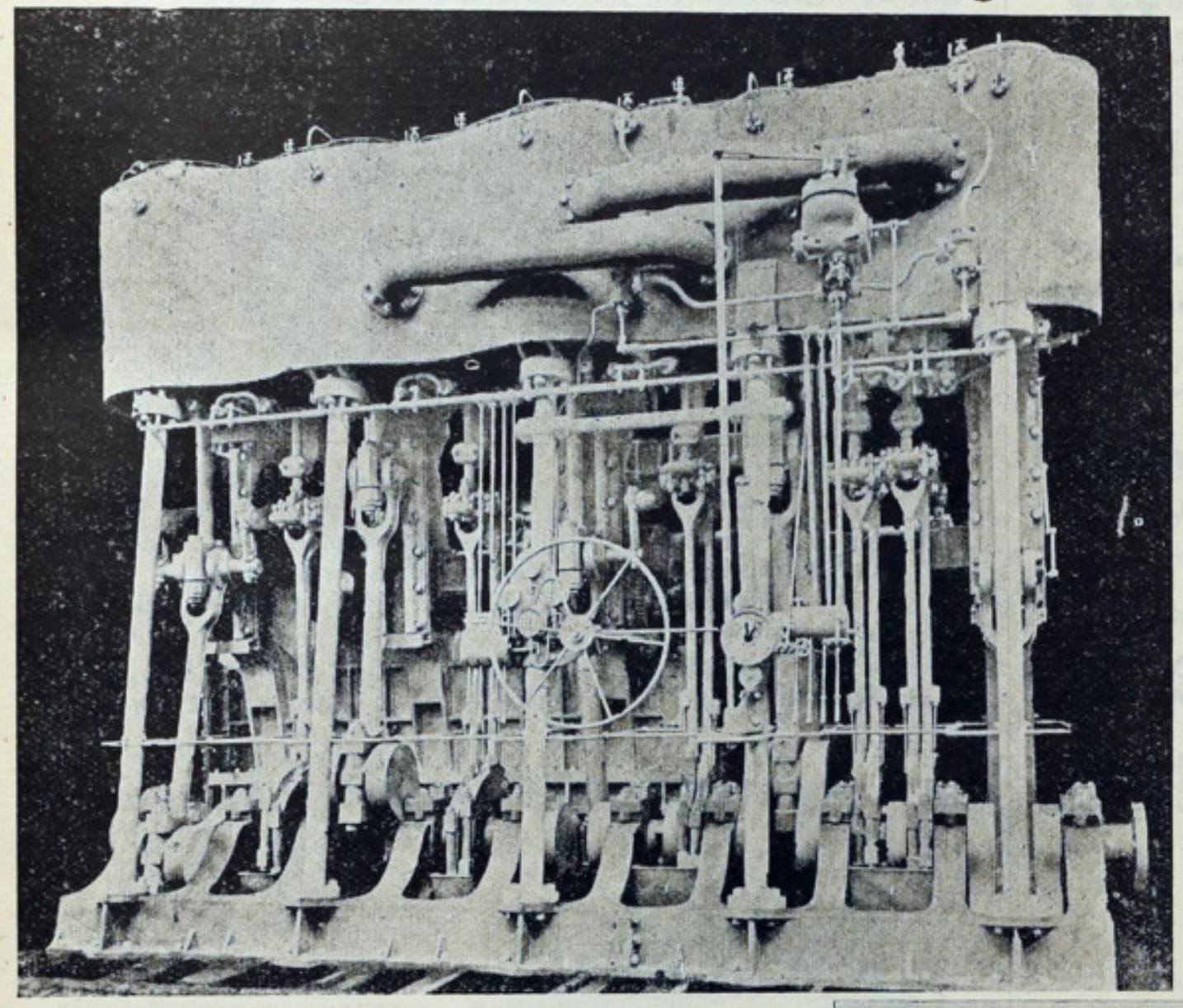
made of tool steel, with hardened joints, and providing for 2¾ inches of vertical movement in a perfectly straight line. Material and workmanship are of the best, and by the elimination of many of the complicated features usually found in indicators, the greatest convenience in use is assured. By means of a telescopic piston rod, the pencil point may be set at any height on the drum for use in connection with condensing engines. The drums are either 1¾ inches or 2 inches in diameter and provisions are made by means of taper bearings, top and bottom, to take up all wear of the drum spindle. The instrument may be changed from right to left hand in a few seconds. For use on ammonia compressors they may be had in steel. The manufacturers are the Hine & Robertson Co., Cortlandt street, New York City.

The Blue Book of American Shipping answers questions that arise daily in every vessel agent or owner's office. If the book is not satisfactory it costs nothing, as the money will be returned. Order at once, No. 409 Perry-Payne building, Cleveland.

A QUEER COINCIDENCE! THAT SERVE RIBBED TUBES AND ELLIS AND EAVES DRAFT

SHOULD BE IN THE BOILERS OF THE

Two Most Economical Cargo Steamers in the World!



ENGINES OF THE INCHMONA—

Hull, 325 feet long,
46½ " beam,
20½ " draft,

Engines, 17, 24, 34, 42 and 42 x 42 in. stroke.

THE BOILERS ARE FITTED WITH SERVE RIBBED TUBES AND THE ELLIS AND EAVES DRAFT.

This steamer carries 5,000 tons cargo, 9 knots an hour on a daily fuel consumption of 11½ tons coal. This amounts to 1.07 lbs. of coal per horse power per hour, over ½ pound less than the best showing made by any lake steamer with any kind of draft, and the lowest ever obtained in marine practice.

ENGINES OF THE KENSINGTON—
(AMERICAN LINE.)

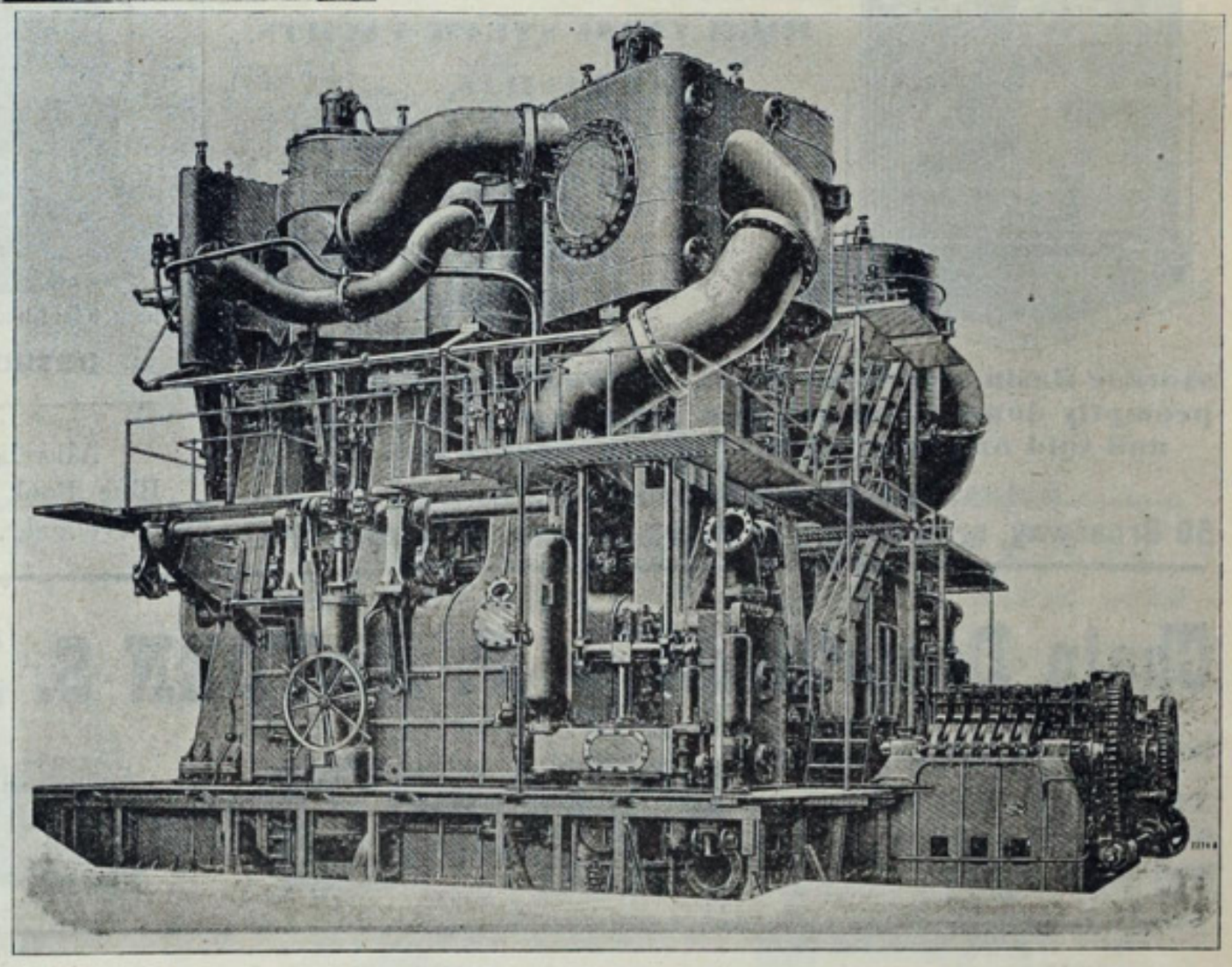
Hull, 480 feet long,
57 " beam,
40 " deep.

Twin Engines, 25½, 37½, 52½ and 74 x 54 in. stroke.

Boilers, Two Double-ended,
15 ft. 9 in. by 21 ft. 5 in.
One Single-ended,
15 ft. 9 in. by 11 ft. 3 in.

FITTED WITH SERVE RIBBED TUBES AND THE ELLIS AND EAVES DRAFT.

Coal consumption per I. H. P. per hour on this steamer is 1.4 lbs. This is ¾ lb. less than the average lake steamer. Her cargo capacity is 10,600 tons.



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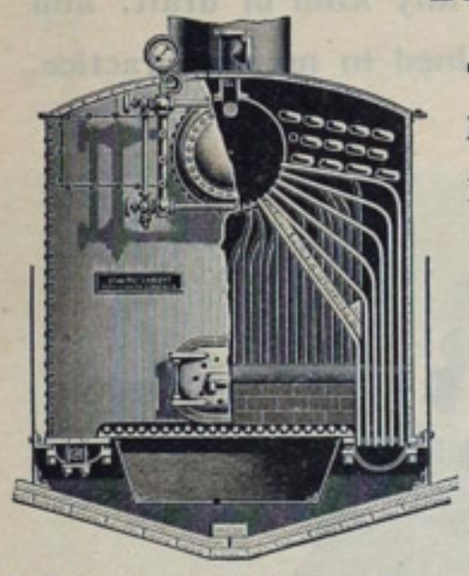

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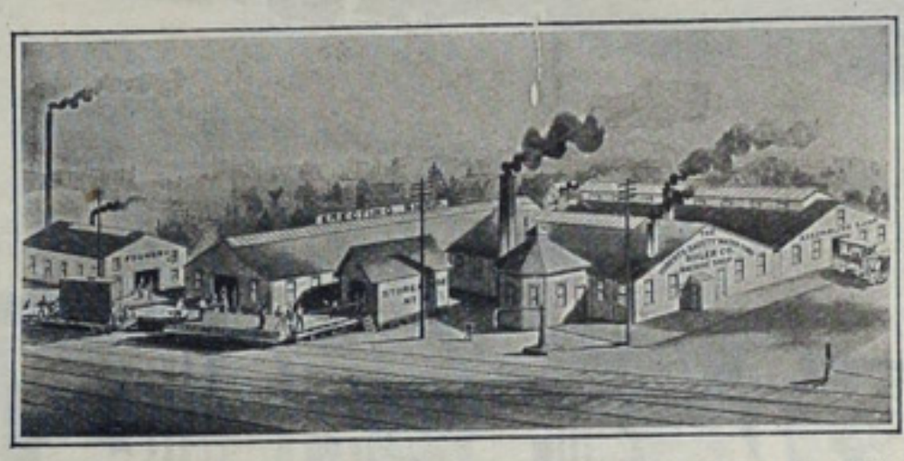

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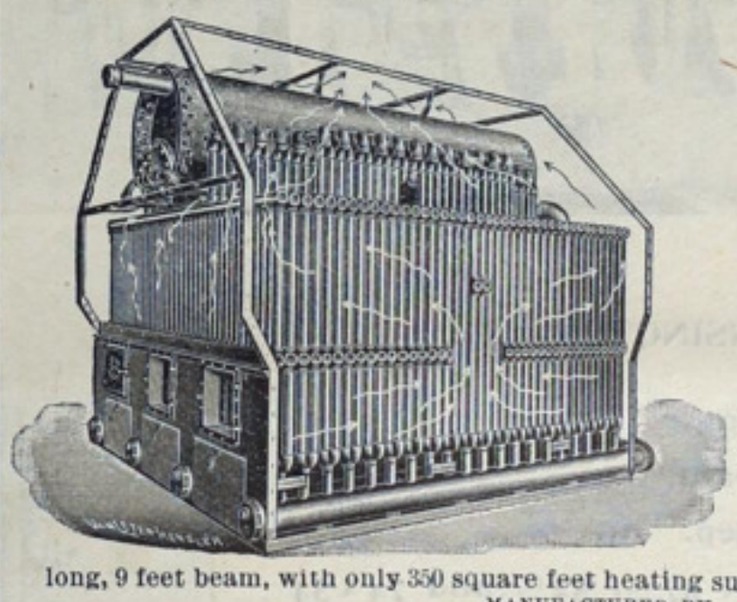

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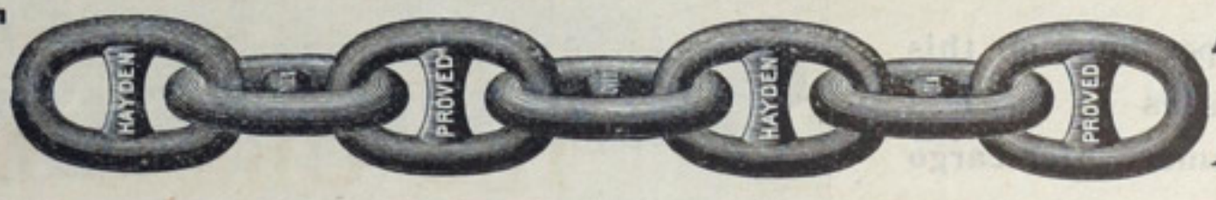

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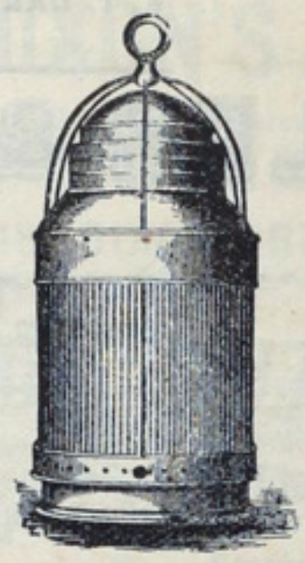

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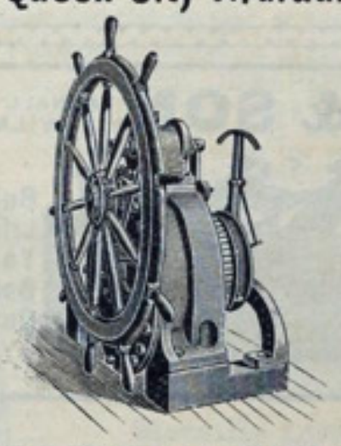

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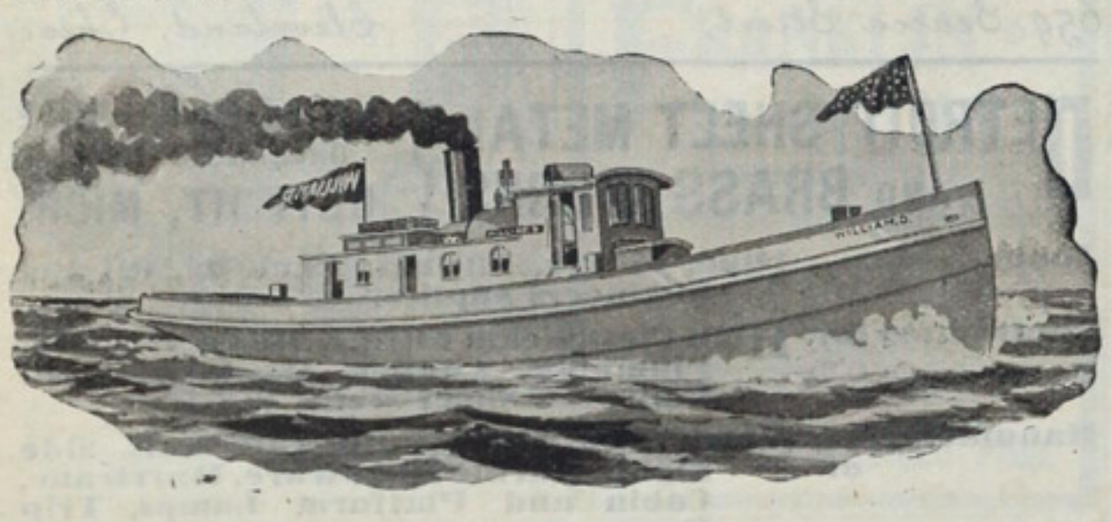

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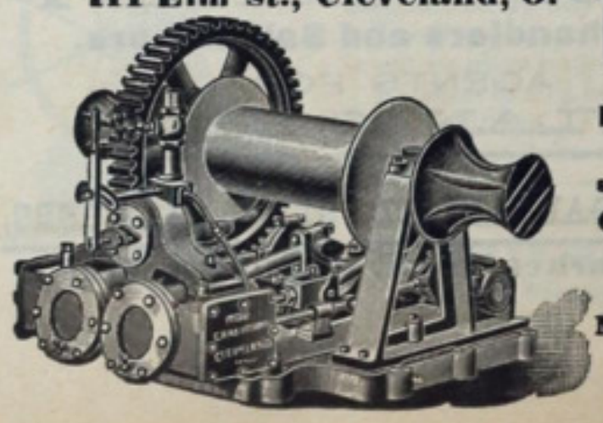

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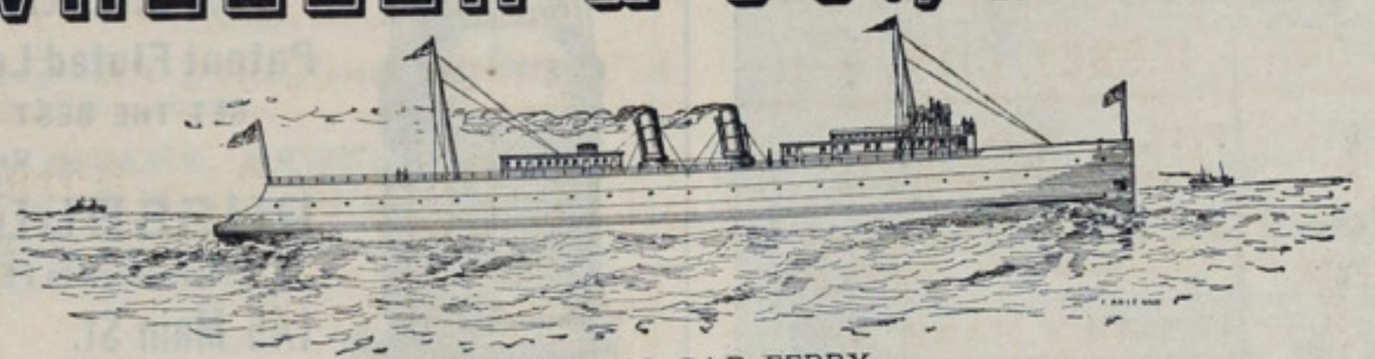

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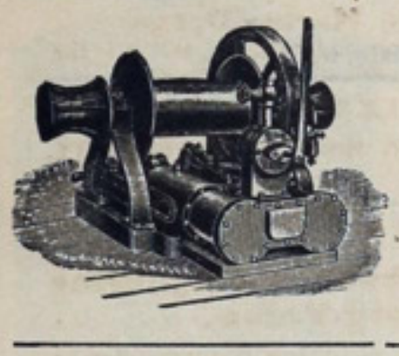

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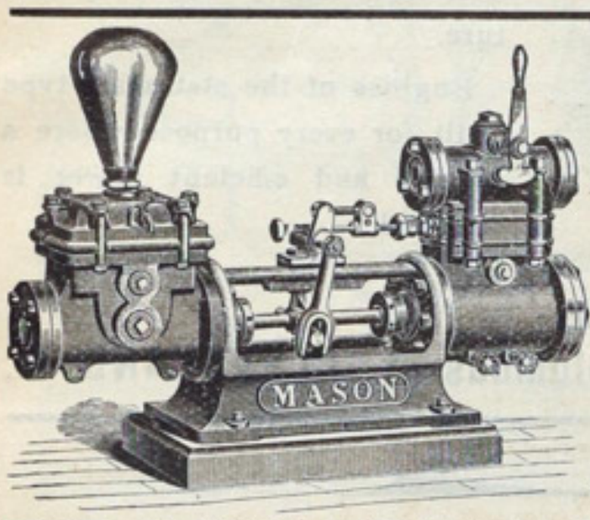

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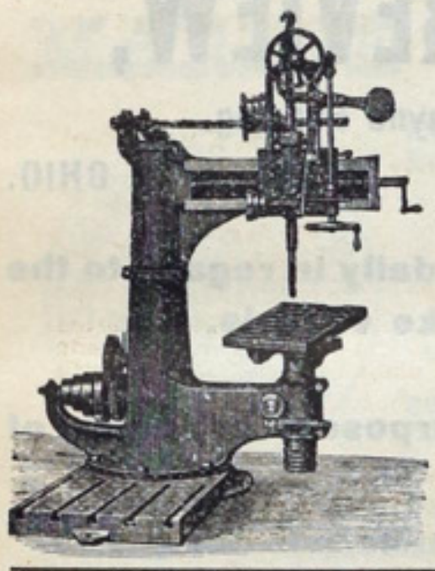

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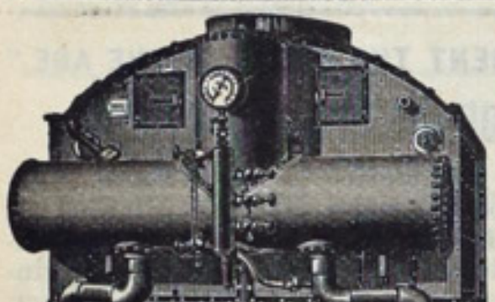

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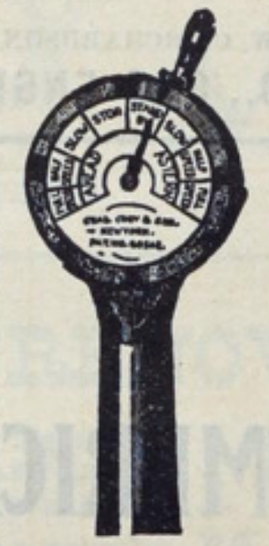

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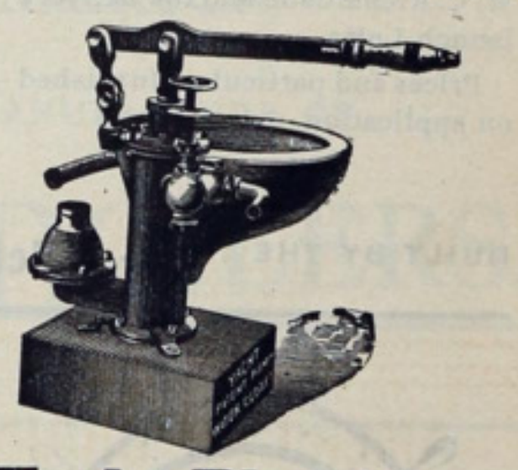

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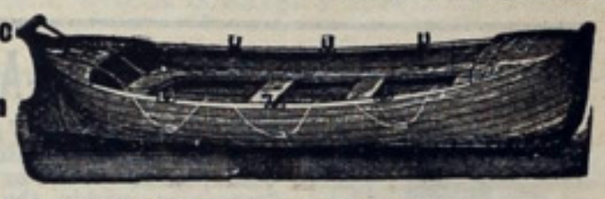

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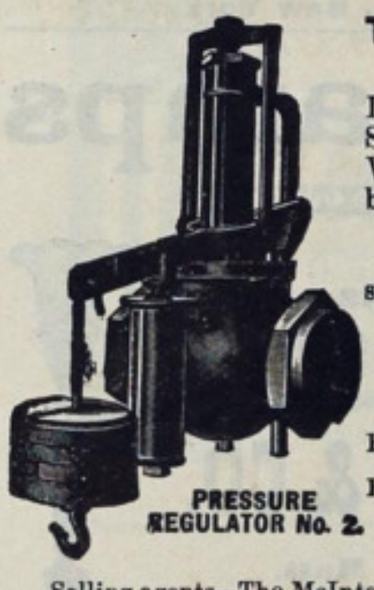

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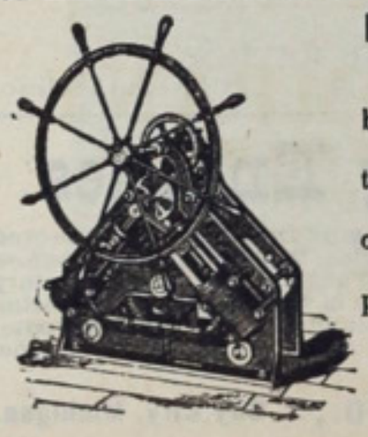

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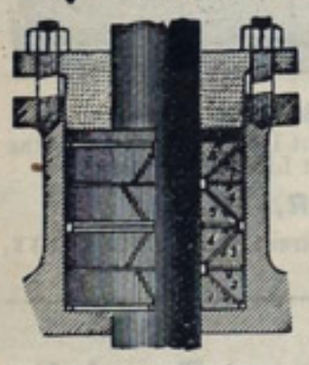

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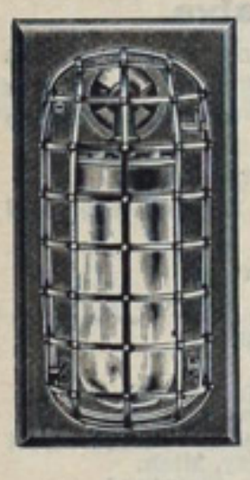

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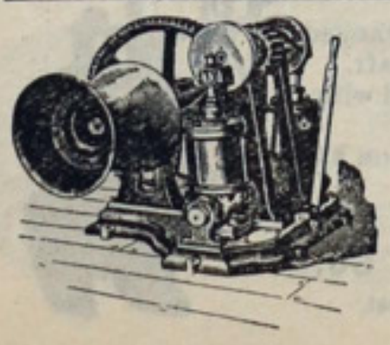

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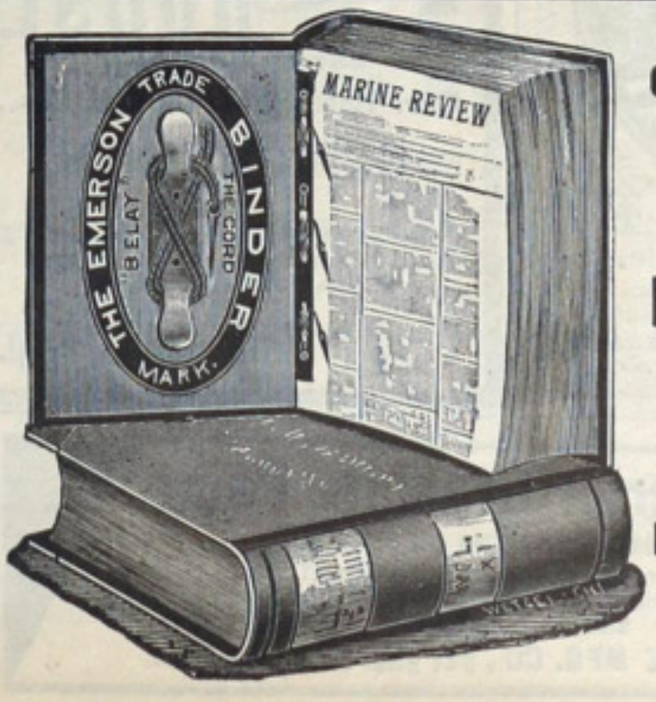

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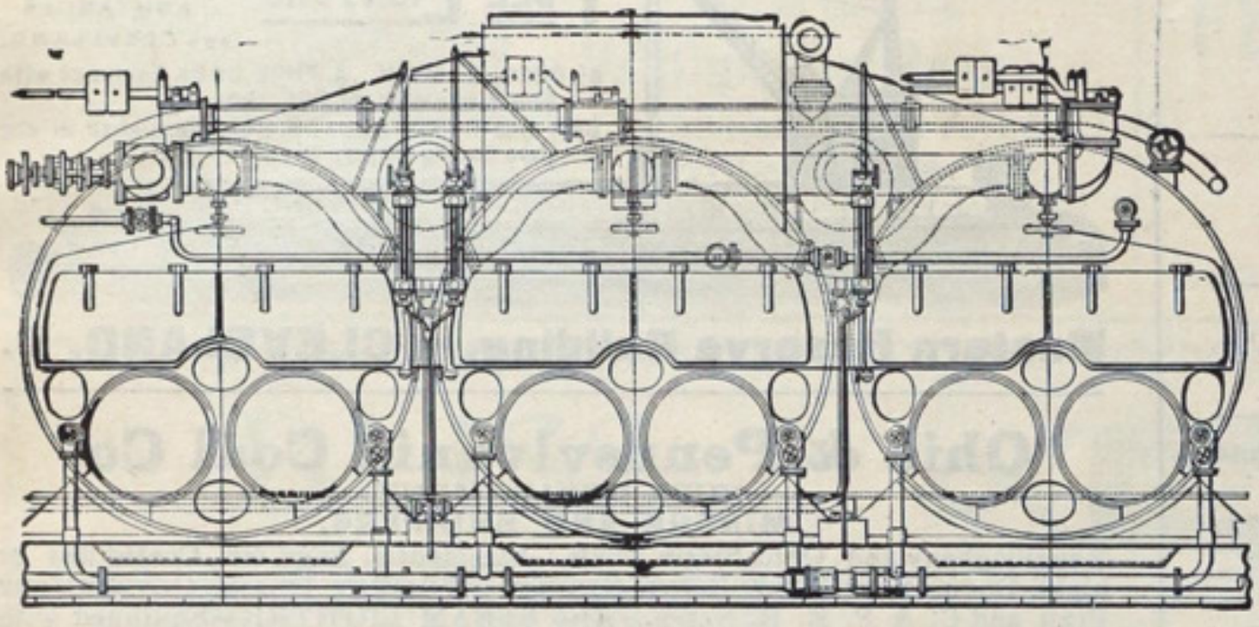

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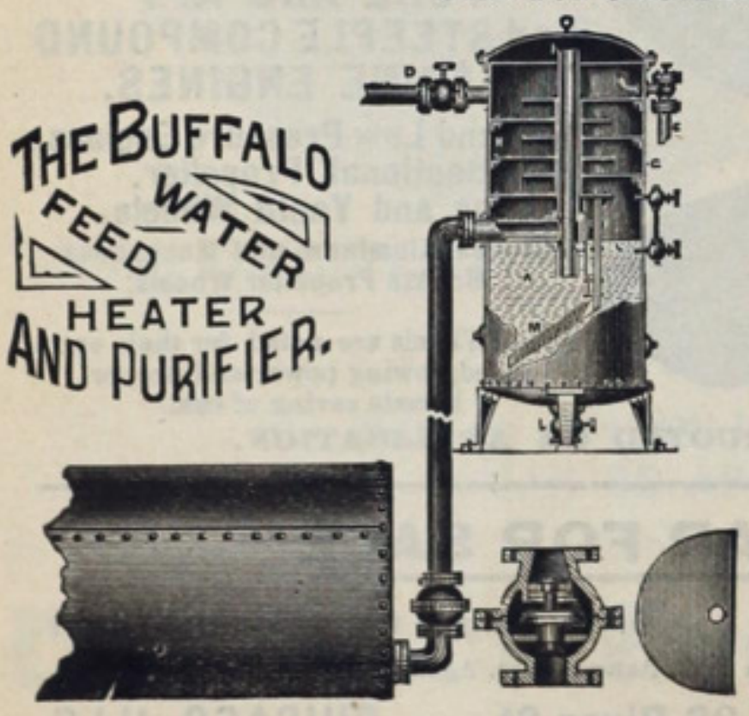

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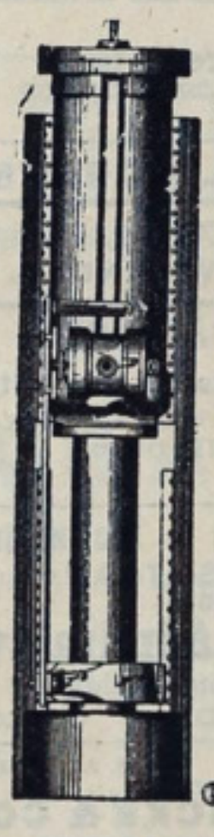

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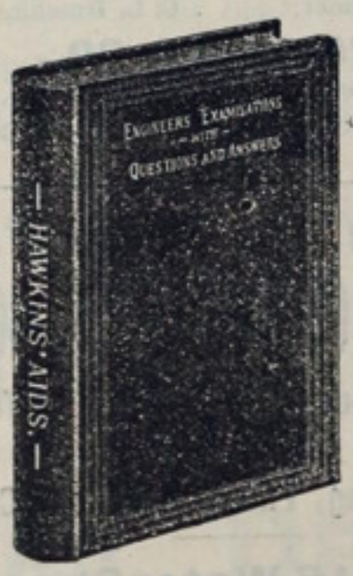

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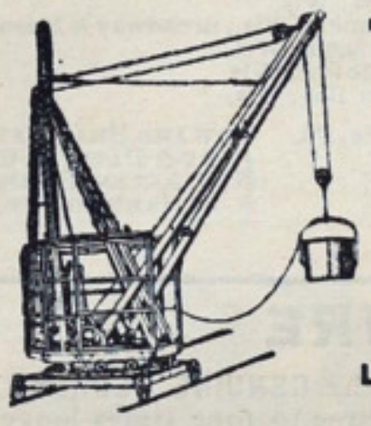
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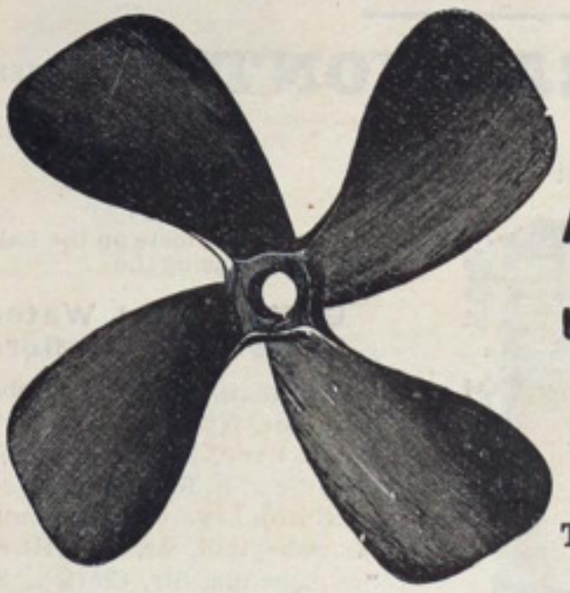
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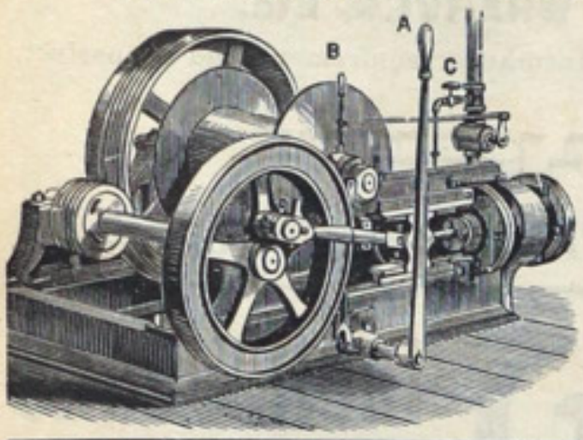

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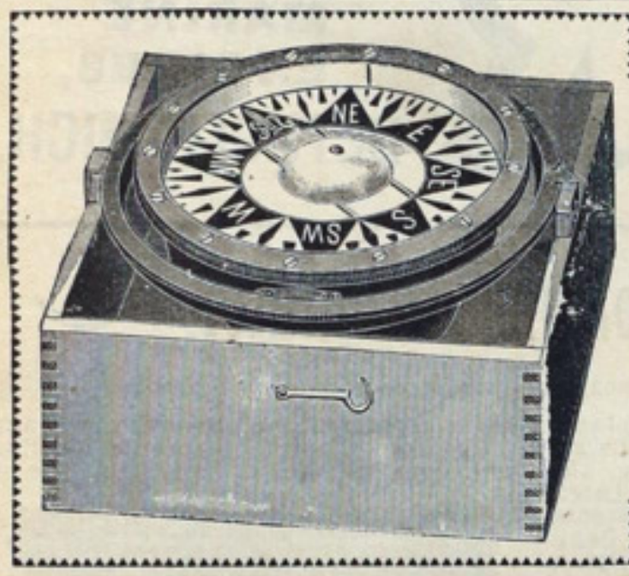

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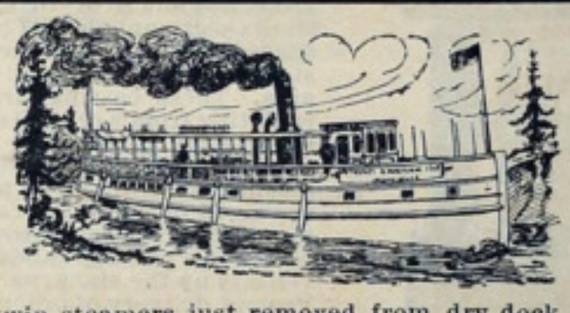

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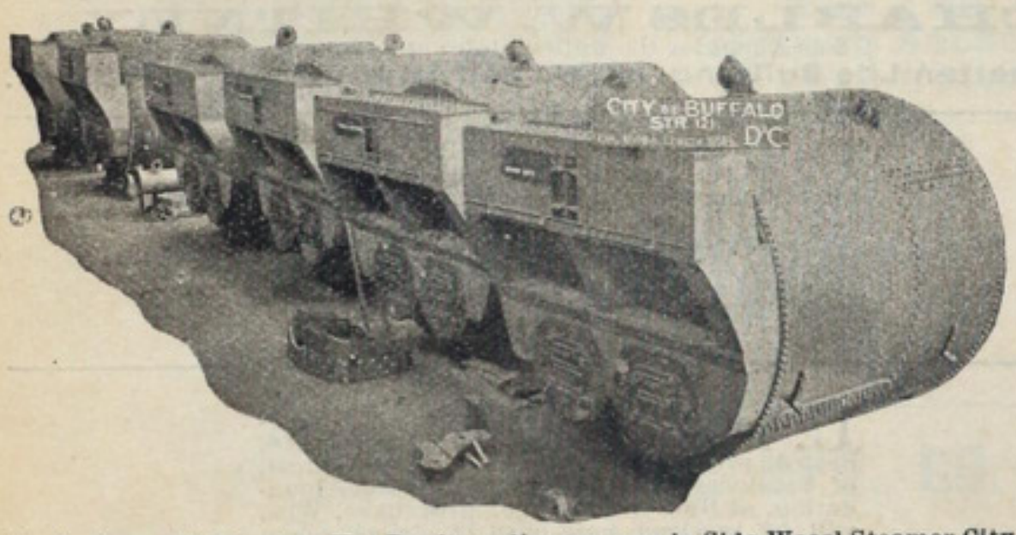

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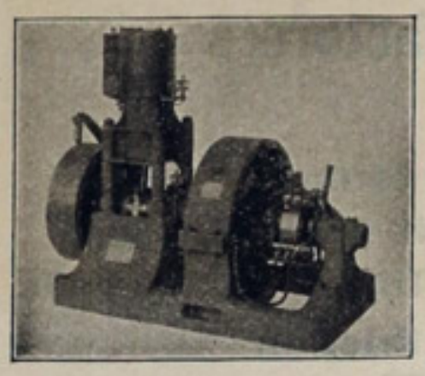

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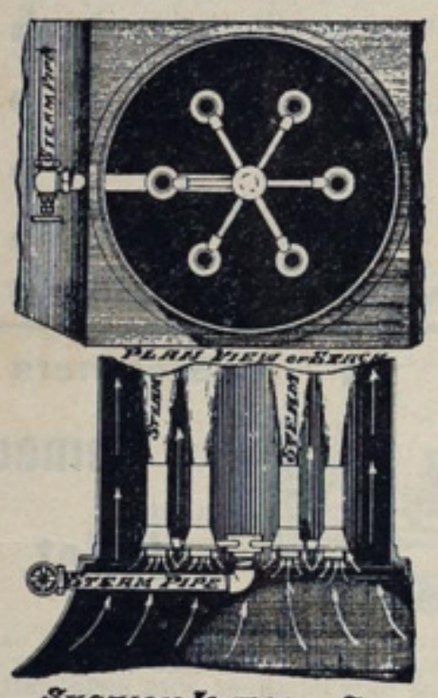

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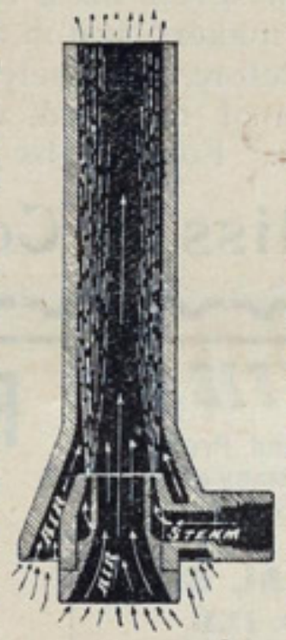
In use on the fast Sound Steamer City of Lowell and famous Delaware River Strs. City of Chester and Brandywine, together with several Cuban and Mexican Strs. Also many Steamships, Side Wheel and Propeller, Lake, Bay and River Strs. Cut on the right shows sectional view of castings, which are spaced at equal distances throughout the stack, making an equal subdivision of its area. These castings are attached to pipes radiating from a central casting attached to steam pipe, as shown on the left. Steam is supplied through these pipes to each casting discharging through an annular opening, as shown by dotted lines, causing a current of air and gases to flow through the central and outside air passages, and discharge at a high velocity up the stack, as shown by arrows. Prompt delivery of orders guaranteed.



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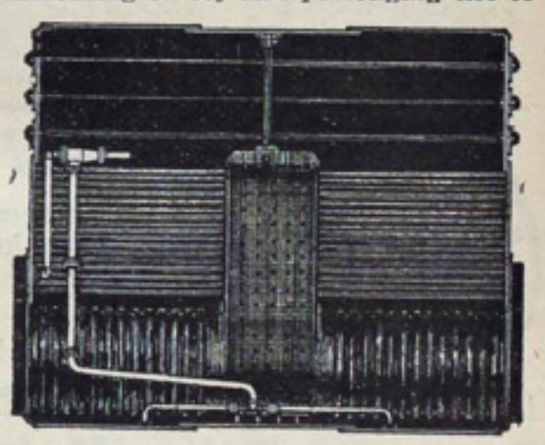

Circulating Apparatus in Boilers of the Ocean Greyhound Str. Paris.

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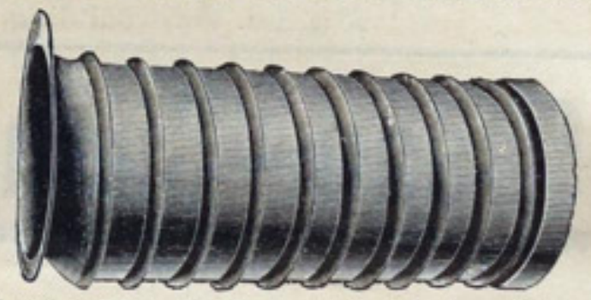

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With this style of Furnace Flue, the rivets at the "back end" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any other part of the boiler. No smith work is required to fit it in a boiler or to refit it when replaced. It is ready for use as it comes from the manufacturers. This style of Flue has been in use six years without a single complaint.

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U. S. ENGINEER OFFICE, DULUTH, Minn., Dec. 16, 1896. Sealed proposals for dredging about 21,000,000 cubic yards in the harbor of Duluth, Minn., and Superior, Wis., will be received here until noon, Feb. 15, 1897, and then publicly opened. Information furnished on application. CLINTON B. SEARS, Major, Engrs. Feb. 12.

U. S. ENGINEER OFFICE, 366 MILWAUkee, St., Milwaukee, Wis., Dec. 17, 1896. Sealed proposals for 1,600 feet, more or less, of Breakwater extension, cribs on stone foundation, at Harbor of Refuge, Milwaukee, Wis., will be received here until 12 o'clock noon, Jan. 9, 1897, and then publicly opened. Information furnished on application. GEORGE A. ZINN, Capt., Engrs. Jan. 8.

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Over 100 of these Anchors on Lake Vessels.

U. S. ENGINEER OFFICE, Duluth, Minn., Dec. 14, 1896. Sealed proposals, in triplicate, for building breakwater at Presque Isle Point, Marquette, Mich., will be received here until noon, Jan. 11, 1897, and then publicly opened. Information furnished on application. CLINTON B. SEARS, Major Engrs. Jan. 7.

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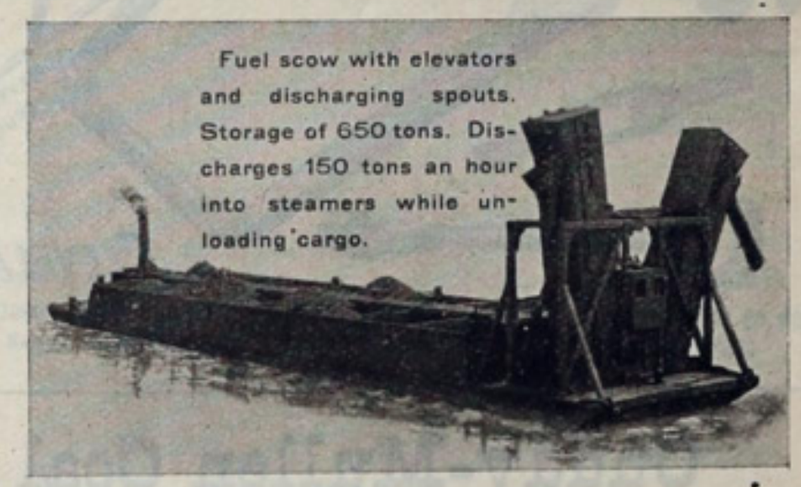
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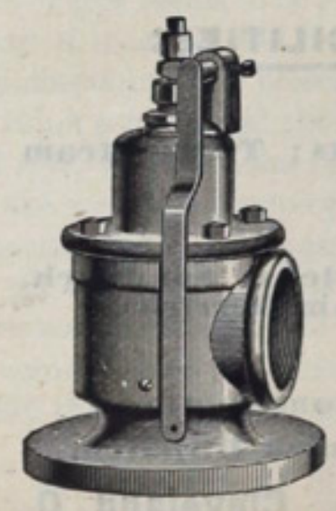

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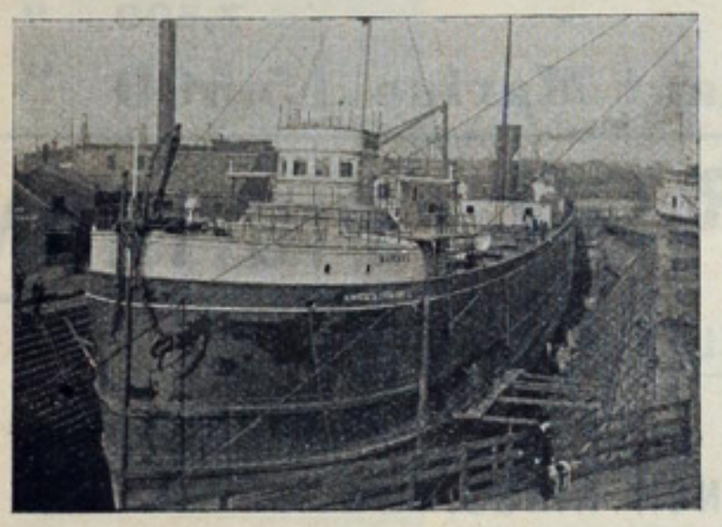

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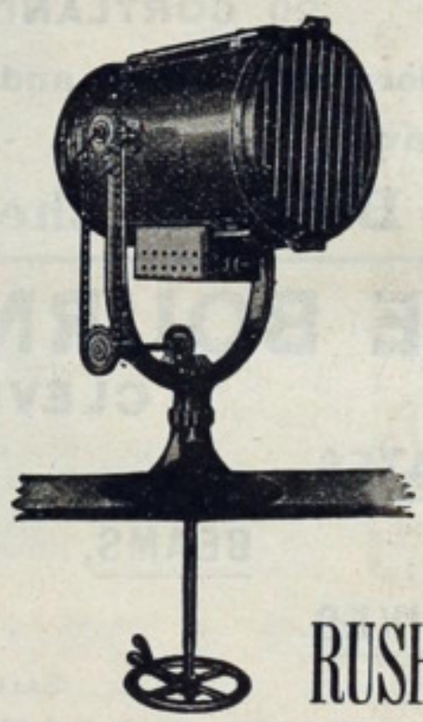

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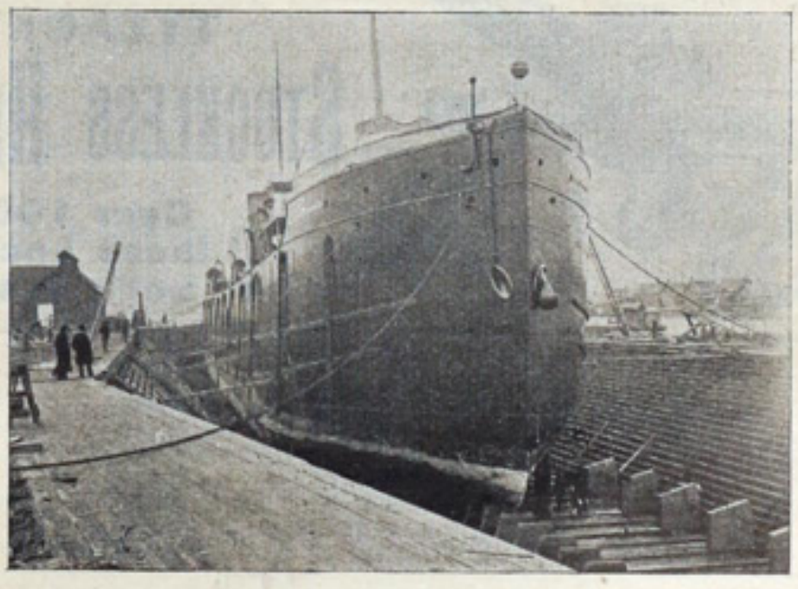

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